Three Essays on Determinants of Accounting Choice

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To the reader:

While financial reporting is a central activity of firms, it is often studied with simple monocausal explanations in mind. Yet, we know that financial reporting and accounting choices are not only influenced by managerial incentives to provide a certain picture to capital providers or to optimize its direct cash flow consequences. In reality, market interdependencies factor into accounting choices. Also, managers act idiosyncratically and existing owners have varying demand for transparency and comparability.

The dissertation thesis of Jochen Pierk looks into three specific issues that are good examples for this inter-relatedness of accounting behavior. The first study, exploring the accounting choices of German firms in the regulated gas utility industry, investigates a product-market effect on accounting choice. The second paper tries to understand the impact of a managerial behavioral bias, overconfidence, on earnings management around managerial turnover. The third paper studies whether existing institutional investors prefer financial reporting to be geared towards transparency or comparability around initial public offerings.

All three studies enhance our understanding of the determinants of accounting choice. In the first and third paper, Jochen has succeeded in identifying well-suited settings that allow him to study unique aspects of accounting behavior. The second paper uses an established approach to measure overconfidence and a relative clean setting to identify earnings management behavior. We learn that firms clearly adjust their reporting strategies if product market regulation presents them with an incentive to do so. Overconfident managers are less likely to engage in big bath accounting and existing investors of smaller firms seem to care more about comparability than about transparency per se.

These findings are relevant because they help us to understand how complex accounting choices are. They might be driven by market interdependencies, heterogeneous investor bases or simply by the nature of the CEO or CFO. For the cross-section of firms, most likely all these alternative explanations will be true for some but not for all firms. Thus, predicting the overall accounting choices of the complete universe of (public) firms (world-wide) is deemed to be a more or less futile attempt. Thus, Jochen should be complemented for his decision to focus on specific firms in specific settings. I hope that his studies will be widely read and used.

Berlin, November 10, 2014

Joachim Gassen

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Berlin, November 10, 2014

Jochen Pierk

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Unintended Regulatory Consequences after Adoption of a new Accounting Regime

Big Bath Accounting - The Bright Side of Managerial Overconfidence

An Introductionary Summary

Three Essays on Accounting Choice

The objective of financial accounting is to provide useful information to meet heterogeneous demand (Ball, 2001). What exactly useful means depends on the respective user of the information. Financial accounting provides pre-decision value relevant information to outsiders and aligns post-decision stakeholder incentives in contracts (Beaver and Demski, 1979). To see accounting thereby as a mechanical measurement system is clearly inappropriate. Accounting rules contain discretion regarding the measurement of economic events and often require judgment, e.g. about the likelihood that a certain event will occur or not occur. Managers have incentives to use these leeways in their favor to maximize their own utility. Thus, research in financial accounting tries to understand the nature of these incentives and their impact on the objectives of accounting.

Accounting research can be divided into positive and normative accounting theory. Historically, accounting academics tried to develop and justify accounting rules and asked the normative question how accounting should be. Watts and Zimmerman (1986) are among the first to systematically describe positive accounting theory which addresses the question how accounting systems work and how we can predict their outcomes. The authors refer to the early and very influential paper of Ball and Brown (1968), often considered as the start of positive accounting theory. Ball and Brown (1968) show empirically that information contained in the annual income number is useful for capital market participants. Since then, the number of empirical archival papers exploring the hypotheses of positive accounting theory in leading accounting journals has increased and the number of qualitative paper has decreased. Today, only a minority of published papers is of normative nature (Oler et al., 2010).

Positive accounting theory, on the one hand, tries to explain what influences managers' decision to use certain accounting rules and, on the other hand, to explain how the accounting outcome affects all kind of stakeholders using this information system. This dissertation sheds further light on the first aspect. What is the managers' incentive structure to influence the accounting outcome? The first paper thereby shows that managers early adopt a new accounting regime if accounting numbers are used by regulators to set prices in utility industries. The second paper argues that personal characteristics of managers influence the reporting behavior around CEO turnover. Finally, the third paper investigates reporting choices in European exchange-regulated markets. Thus, all papers give new insights into determinants of reporting behavior of managers.

The first paper '*Unintended Regulatory Consequences after Adoption of a new Accounting Regime*' investigates the interplay between a revised accounting regime and price regulation in the European utility industry. The paper is coauthored with Matthias Weil, a former doctoral student of the accounting group.

The European Commission requires all member states of the European Union to establish national regulators that set prices in utility industries. In particular, the study first shows that firms from the German gas utility industry are more likely than other German firms to voluntarily adopt a revised accounting regime early, thereby opportunistically influencing regulated prices. In a second step, we estimate the overall effect on prices in the gas utility industry. The study is related to Watts and Zimmerman (1978) who argue that firms engage in earnings management to influence regulatory outcomes.

In Germany, the introduction of new German-GAAP coincides with a cost audit for revenue caps of the gas utility industry for the regulation period 2013 to 2017. Firms that choose to voluntarily early adopt new German GAAP in 2009 can influence average values (e.g. regulatory equity) of the year of the cost audit 2010.

Based on a full-text search in the German Electronic Federal Gazette we identify all early adopters and show that firms from the utility industry are over-represented. Based on the early adoption in combination with the publicly available calculation scheme of revenue caps we estimate that early adoption leads to discounted profits on average of between € 775k and € 1,623k. Further, we illustrate that it is not beneficial for all firms to early adopt new German GAAP. Cross-sectional results indicate that non-adopters from the utility industry have less discretion to increase future revenue caps.

Next, we argue that the introduction of the new accounting regime has an economically significant impact on revenues. Early adopters influence year-beginning and year-end values of the respective balance-sheet items since the cost audit was in 2010 and firms early adopted in 2009. Non-adopters only influence year-end values since adoption was mandatory in 2010. The total increase in revenue based on early adopters and non-adopters is estimated between 6.40 and 13.60 Euro per household within the regulation period 2013 to 2017.

The paper contributes to the existing literature regarding industry specific regulation (e.g. Jones, 1991; Cahan, 1992; Key, 1997; Paek, 2001; Omonuk, 2007; Gill-de-Albornoz and Illueca, 2005) by analyzing the interplay of financial reporting decisions and price regulation in the German utility industry. This interplay is caused by a EU regulation which is effective in all 28 member states. Furthermore, to the best of our knowledge, we are the first to provide direct evidence of regulatory consequences after the adoption of a new accounting regime.

The second paper '*Big Bath Accounting – The Bright Side of Managerial Overconfidence*' is coauthored with Valentin Burg and Tobias Scheinert, both doctoral students from the corporate finance group at Humboldt University. The paper empirically investigates the interplay between a specific managerial characteristic, overconfidence, and the decision to take an earnings bath following CEO turnover. An earnings bath is commonly

known as the decision to write-off large amounts to shift earnings to the future. This behavior is especially observed in the context of a CEO change. Incoming CEOs use large write-offs and attribute the losses to their predecessors (e.g. Pourciau, 1993; Wells, 2002).

We hypothesize and find that overconfident CEOs are less likely to engage in such a big bath behavior. Overconfident CEOs overestimate their ability and consequently believe that the company's projects will realize higher earnings in the future when these projects are managed by them. Therefore, they are likely to believe that they will reach their earnings targets regardless of a potential big bath. CEOs face a trade-off between costs (e.g. increased SEC scrutiny, providing additional information, labor market consequences) and benefits of earnings management. Since overconfident CEOs place a lower value on the benefits of engaging in big bath accounting, we expect to find a negative relationship between overconfident CEOs and the probability to take a big bath.

Our measure of overconfidence is based on Malmendier and Tate (2005) and uses managers' stock option portfolios following Yermack (1995) and Hall and Liebman (1998). Managers are either classified as overconfident or as rational. The idea of this methodology is that managers typically are poorly diversified and should exercise executive options as soon as possible in order to reduce their exposure to firm-specific risk. Therefore, we classify CEOs as overconfident if they ever hold an option until maturity which is at least 40 percent in-the-money at the year-end prior to maturity.

Our findings suggest that overconfident managers are less likely to engage in big bath accounting. Big bath is measured as write-offs in form of special items following Elliott and Shaw (1988). We address potential endogeneity issues in several ways, e.g. by controlling for the turnover type (routine vs. non-routine), by modeling the choice to hire an overconfident manager and by accounting for a potential selection of rational CEOs into firms with higher big bath potential. The paper advances our understanding of managerial behavior around CEO

turnover and further contributes to the growing literature of managerial overconfidence in financial accounting.

The third paper '*Reporting Choices of Firms in European Exchange-Regulated Markets*' sheds light on financial reporting decisions in European exchange-regulated markets. These markets are not within the scope of Regulation 2002/1606/EC, mandating the use of International Financial Reporting Standards (IFRS), since they are not a EU-regulated market. This means that these firms are not required by the European Commission to use the IFRS. Mostly, exchange-regulated markets allow firms to choose between IFRS and local GAAP (with the notable exception of AIM London). In particular, the paper investigates determinants of voluntary IFRS adoption and voluntary quarterly disclosures in the European exchange-regulated markets.

The sample consists of 226 admissions to the European exchange-regulated markets of Amsterdam, Brussels, Lisbon, Frankfurt, and Paris. The results show that less than 20% of the firms voluntarily prepare financial statements in accordance with IFRS and less than 20% voluntarily provide quarterly information. Even among the IFRS adopters, 65% do not provide quarterly reports.

Determinant models reveal that the proportion of diversified investors is significantly positively related to the probability of using IFRS, but not related to the decision to voluntarily report quarterly. This finding could potentially be explained by the relative importance of comparability vs. transparency. Firms that voluntarily adopt IFRS now use the same set of rules as firms of EU-regulated markets. It might be that diversified investors benefit more from comparable financial statements than non-diversified investors since the same set of rules potentially reduces costs of managing their portfolio.

Furthermore, Maffett (2012) shows that institutional investors prefer opaque firms as they benefit from privately informed trading. This is consistent with the finding of the paper

that diversified investors are not more interested in quarterly reporting than non-diversified investors.

The third paper contributes to the literature by examining reporting choices in European exchange-regulated markets. Moreover, the paper shows the relationship between diversified investors and the decision to voluntarily adopt IFRS and voluntary providing quarterly financial information.

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Unintended Regulatory Consequences after Adoption of a new Accounting Regime

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Abstract:

This paper empirically investigates regulatory consequences after the adoption of a new accounting regime. Specifically, we analyze the impact on revenues in the price-regulated European utility industry by investigating the regulatory effects of the adoption of a revised accounting regime in Germany. Firm-specific revenue caps are determined during a financial statement-based cost audit. We find that regulated firms are more likely than non-regulated firms to voluntarily adopt new German GAAP early, thereby achieving higher regulated revenues. Manually analyzing financial statements, we are able to estimate the increase in firm-specific allowed revenues for the regulation period 2013 to 2017. Our paper shows cash-flow consequences as the result of an accounting regime change and thus contributes to the understanding of possible regulatory consequences of new accounting regimes.

Keywords: *Incentive-regulation, price-regulation, German GAAP, IFRS for SME, governmental intervention*

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1. Introduction

The consequences of the adoption of a new accounting regime are of interest for regulators and researchers alike. A focus of recent studies was the adoption of the International Financial Reporting Standards (IFRS) around the world. Researchers mostly focused their attention on capital market consequences of publicly traded firms. In contrast, with the exception of the banking sector (e.g. Bushman and Landsman, 2010; Gebhardt and Novotney-Farkas, 2011), little is known about consequences in regard to industry specific regulations. The introduction of a new accounting regime can trigger unintended consequences if industry-specific regulations are linked to financial reporting. Thus, knowing and understanding these interplays is crucial for regulators and standard setters. In order to contribute to the understanding of regulatory consequences of financial accounting, we are interested in the introduction of a new accounting regime and price-regulation of utilities. We hypothesize that in a setting where regulated prices are directly linked to accounting numbers, managers use discretion upon adoption of a new accounting regime to increase regulated prices. Thus, unintended consequences may occur.

To the best of our knowledge, there is no evidence on the consequences of the introduction of a new accounting regime on industry specific regulations. Even the extensive literature on IFRS adoption is not addressing this issue (Brüggemann et al., 2013). A stream of literature related to our study is based on the *governmental intervention argument* by Watts and Zimmerman (1978) where companies engage in earnings management to get favorable regulation or to avoid non-favorable regulation (e.g. Jones, 1991; Cahan, 1992; Key, 1997; Paek, 2001; Omonuk, 2007; Gill-de-Albornoz and Illueca, 2005). The underlying assumption of these studies is that the regulator is not (fully) able to anticipate earnings management of these firms.

Our study is different from those studies in several important ways. First, in the above mentioned studies the regulation might only be affected if the adoption of a new accounting regime coincides with an investigation period. Thus, there might be no immediate effect of earnings management. Furthermore, even when the accounting change falls within an investigation period, it is unclear whether the regulatory outcome is affected as the regulator might be aware that the underlying economics have not changed. In contrast, our study investigates regulatory consequences in a setting where regulated prices are directly linked to accounting numbers. Second, most former studies use accrual expectation models to analyze the link between regulation and accounting. This likely introduces errors because accruals are classified as being abnormal (normal) when they are normal (abnormal). We directly observe discretionary choices by managers. Thus, our study is not exposed to such estimation errors. Third, empirical evidence on the interplay of accounting choice in regulated settings indicates that regulated firms manage earnings in order to increase shareholder wealth. However, evidence regarding the success of earnings management is vague and in most cases not quantifiable (Fields et al., 2001). We are able to estimate cash-flow consequences resulting from the adoption of a new accounting regime and thus provide regulatory consequences in a more direct way.

To test our hypothesis, we investigate industry-specific regulatory consequences in a European setting. Directives 2003/54/EC and 2003/55/EC[1] of the European Commission require EU member states to establish national regulators who fix or approve tariffs in the gas and electricity utility market. The main goal of this governmental intervention is to ensure low prices and high quality supply at the same time. The most common system used by national regulators to achieve this goal is the incentive-regulation (e.g. in Germany, the UK, France, Italy, Spain and Belgium). Incentive-regulation refers to price or revenue caps in

[1] Directive 2003/54/EC (2003/55/EC) of 26 June 2003 concerning common rules for the internal market in electricity (natural gas) and repealing Directive 96/92/EC (98/30/EC).

combination with an efficiency component. We test our hypothesis in a German setting because we can use the (early) adoption of new German GAAP (Bilanzrechtsmodernisierungsgesetz, BilMoG) as a clearly identifiable and economic relevant accounting choice.

In Germany, revenue caps for the gas utility industry for the regulation period 2013 to 2017 are based on a cost audit in 2010. The revenue caps comprise specific operational expenses incurred in 2010 plus a fixed percentage of return on average equity (ROAE). The relevant values are based on accounts that have to be prepared in accordance with German GAAP. New recognition and valuation principles affect the calculation of revenue caps in various ways.

Companies have to comply with new German GAAP[2] from 2010 on. Since the cost audit was in 2010, year-end values of the respective balance sheet items (e.g. equity) are affected. Early adoption of new German GAAP was allowed for financial years starting in 2009. Companies choosing to adopt new German GAAP early had the opportunity to increase their revenues by influencing average values of 2010 (e.g. equity). Early adoption increases the total effect since in this case year-beginning values are affected as well. We first show that managers opportunistically chose early adoption to increase future regulated prices. Next, we estimate the overall effect on the economy based on early and non-early adopters.

We manually identify voluntary adopters of new German GAAP using a full-text search in the German Electronic Federal Gazette (*Elektronischer Bundesanzeiger*). This procedure yields a sample of 344 voluntary adopters. We find clear evidence that regulated firms are more likely to adopt BilMoG early than other companies. Manually analyzing financial statements we are able to estimate specific changes that influence revenue caps. We use this data and the publicly available calculation scheme for revenue caps to directly

[2] We label German GAAP before BilMoG as old German GAAP (HGB-Old). German GAAP after BilMoG is referred to as new German GAAP (HGB).

estimate the effect of early adoption. The estimated increase in revenues for the five-year regulation period results in a discounted profit (by inflation) on average of between € 775k and € 1,623k. Deflated by book value of equity of 2008, the profit is on average between 16.5% and 34.6%. Additional costs only arise from accounting-related efforts regarding the early adoption.

We further observe that not all companies of the incentive-regulated gas industry adopted new German GAAP early. We find that for non-adopters an early adoption of new German GAAP would have allowed less discretion to increase future revenue caps. For some firms, the changes upon adoption would have even decreased future prices. We conclude that for these companies the changes in future revenues do not justify the costs of early adoption.

Overall, the introduction of new Geman GAAP has an economically significant impact. We estimate that both early and non-early adopters from the gas utility industry increase revenues between 260 and 540 million Euro within the period from 2013 until 2017. Converted to a per household effect the increase is between 6.40 and 13.60 Euro.[3]

It could be argued that the regulator is aware of GAAP changes and anticipates this in the calculation of revenues. We argue that there is multiple evidence, apart from our results, that firms early adopted to increase future prices. We could not find any indication that the changes were anticipated by the regulator. Also, there is anecdotal evidence that firms early adopted to increase future prices (by talking to a CFO of an early adopting firm). Furthermore, even auditing firms and specialized consultants advised firms to early adopt in order to increase regulatory equity (Pricewaterhousecoopers, 2009; Breuer and Mayer, 2010).

Our contribution to the existing literature is twofold. First, we contribute to the understanding of economic consequences of a new accounting regime. We describe the interplay between prices and accounting figures in the German utility industries caused by a

[3] The effect of the electricity industry is not included. Thus, the overall effect of the gas *and* electricity utility industries is likely to be bigger. We do not include firms from the electricity industry since the cost audit in 2011 was unaffected by *early* adoption of new German GAAP in 2009.

EU regulation, which is affective in all 28 member states. We find that managers use early adoption of new German GAAP opportunistically to increase prices. Second, while extant literature only provides indication of possible industry-specific regulatory consequences of accounting choice, we provide economic consequences in a direct way. Using hand collected data from the notes; we are able to directly estimate cash flow changes attributable to the adoption of new German GAAP.

Our results are especially important for standard setters, which intend to introduce a new accounting regime. In July 2009, the International Accounting Standard Board (IASB) published the International Financial Reporting Standards for small and medium-sized companies (IFRS for SMEs, IASB, 2009). The consultation of the European Commission (European Commission, 2010) as well as the academic debate does not fully address all possible consequences of a new accounting regime. We argue that the current debate of the IASB to expand the IFRS to private firms is incomplete and unintended consequences will occur. New German GAAP is, according to the objectives of the German Federal Parliament, comparable to IFRS (Deutscher Bundestag, 2009).

The remainder of the paper is organized as follows. In Section 2, we review the literature on regulatory consequences of accounting choice. Next, we explain the institutional background of the accounting environment in Germany and of price-regulation in the German gas and electricity utility industry. Section 3 contains the development of our hypotheses. In Section 4 we describe the sample selection and research design. We empirically investigate accounting choice of price-regulated firms in Section 5. Section 6 concludes.

2. Related Literature and Institutional Setting

2.1 Related Literature

We are not aware of any studies that examine the interplay between the adoption of a new accounting regime and industry-specific regulation, with the exception of the banking sector. A stream of literature related to our research question investigates the interplay between accounting choice and industry-specific regulation. Most of this stream is related to the political cost hypothesis. If earnings of specific companies are likely to be influenced by governmental intervention, managers have the incentive to adjust their earnings to avoid or influence governmental interference. The influence thereby could be indirect because earnings seem to be "excessive" (potential future regulation) or directly through existing regulation (Watts and Zimmerman, 1978). Many studies focus on specific settings or industries. Jones (1991) observes income decreasing earnings management during import relief investigations by the United States International Trade Commission. A comparable incentive is also documented for antitrust investigations (Cahan, 1992). D'Souza (1998) finds that managers of companies from the rate-regulated U.S. electricity industry use more cost inflating assumptions under SFAS 106 to maximize current rate recoveries if they face higher uncertainties about their future ability to recover costs. Paek (2001) documents income decreasing accruals in the context of the U.S. rate-regulated electricity industry. Omonuk (2007) finds evidence that managers of electricity firms reduce earnings in the year they file for rate increases. Gill-de-Albornoz and Illueca (2005) document that Spanish electricity companies reduce earnings after price tariffs are introduced.

Our study relates to a stream of literature, which analyzes economic consequences of accounting method changes in the context of IFRS adoption. Many of these studies find positive capital market effects around IFRS adoption (e.g. Leuz and Verrechia, 2000; Daske et al., 2008; DeFond et al., 2011). Although industry-specific regulatory consequences are

also likely to occur in this setting, we are not aware of any study analyzing such consequences around IFRS adoption (Brüggemann et al., 2013).

Direct evidence on economic consequences in regulated settings is vague and in most cases not quantifiable. Consequently, in their overview article on empirical research regarding accounting choice, Fields et al. (2001: 299) criticize the fact that "research results fail to provide compelling evidence of the implications of alternative accounting methods and we recommend more efforts to determine the nature of such implications. The literature provides ample circumstantial evidence that accounting choice matters but little direct evidence".

To the best of our knowledge, we are the first to investigate managerial incentives to adopt an accounting regime stemming from price-regulation in the European Union. Furthermore, in contrast to past studies which provide only indications of economic consequences, we are able to estimate direct cash flow consequences in a regulated setting. To illustrate the role of regulatory consequences after adoption of a new accounting regime, it is crucial to show the magnitude of economic consequences instead of only indicating them. Our setting allows us to address regulatory consequences of accounting choice in a more direct way compared to prior studies.

2.2 Institutional Setting

2.2.1 Accounting Environment in Germany

Irrespective of their listing status all German limited liability partnerships and corporations have to prepare individual financial statements in accordance with German GAAP (§ 264 and § 264a HGB). Individual financial statements are the basis for a wide range of contractual claims, e.g. dividends, tax payments, interests, salaries and regulatory issues (Ball et al., 2000). Therefore, even for publicly listed companies which are required to use IFRS, individual financial statements prepared in accordance with German GAAP play an important role.

Former German GAAP was considered a prudent accounting regime with low disclosure levels (e.g. Saudagaran and Biddle, 1992; Leuz and Verecchia, 2000). Consequently, financial statements prepared under German GAAP were criticized as less informative than those prepared in accordance with IFRS (e.g. Weißenberger et al., 2004). Overall, former German GAAP less focused on addressing information asymmetries between managers and owners. Instead, it was used as a contracting device with external stakeholders.

As a response to this critique, in May 2009 the German legislature passed the biggest change in German accounting regulation in the last 25 years. Besides a deregulation of accounting for micro-firms, new German GAAP aims to provide more informative financial statements (Bundesministerium der Justiz, 2007). Consequently, the link between financial and tax accounting was reduced and optional accounting principles were abolished. Many changes lead to a less prudent accounting regime and increased book values of equity. Equity increasing revaluations could affect both assets and liabilities.[4] Furthermore, new German GAAP requires several new disclosures, e.g. related party disclosures, a detailed description of off-balance-sheet transactions and a schedule of audit and non-audit fees. Most changes push German GAAP towards IFRS, whereas some concepts are even adopted from IFRS (e.g. identification of special purpose entities, determination of deferred taxes, main principles of hedge accounting, determination of related parties). New German GAAP is applicable for financial years beginning in 2010. Voluntary adoption was possible for financial years starting in 2009 (article 66 (3) EGHGB[5]). The changes of BilMoG do not affect the tax base because tax specific regulation offsets these changes.

2.2.2 Price-Regulation in the European Utility Industry

Directive 2003/54/EC and Directive 2003/55/EC require EU member states to establish a national regulator for utility networks. The regulators should fix or approve tariffs

[4] Appendix A presents key changes and their effects on book equity.
[5] Introductory Act to the German Commercial Code.

in the gas and electricity market. To further push the full liberalization of the European gas and electricity market and to regulate generation, transmission, distribution and supply of gas and electricity, Directives 2003/54/EC and 2003/55/EC were replaced by Directives2009/72/EC and Directive 2009/73/EC [6]. Member states must ensure non-discriminatory and cost-reflecting prices by granting gas network operators incentives to increase efficiency.

The composition of gas and electricity markets varies in each member state of the European Union. Also, national regulators use different methods to ensure efficient pricing. Historically, the most common systems were the cost-plus regulation, the incentive-regulation and the yardstick-regulation. The cost-plus regulation guarantees to cover operational expenses plus a profit margin. The Netherlands, for example, use the yardstick-regulation where prices are linked to the costs of a peer group, not an individual benchmark. Prices are not allowed to exceed the mean of the costs of the peergroup.

Incentive-regulation refers to price or revenue caps in combination with an efficiency component. The efficiency component is based on a benchmark mechanism and incentivizes regulated companies to work cost-efficiently. The goal of incentive-regulations is to achieve cost reductions by giving regulated companies the incentive to work cost-efficiently. In recent years most member states have implemented incentive-regulations (e.g. Germany, the UK, France, Italy, Spain, and Belgium). Table 1 shows the methods used and the industry composition of the seven biggest economies of the European Union.

2.2.3 Price-Regulation in the German Gas Utility Industry

The German gas utility market currently consists of 14 transmission system operators (TSO) and approximately 700 distribution system operators (DSO) (International Energy

[6] Directive 2009/72/EC (2009/73/EC) of July 2009 concerning common rules for the internal market in electricity (natural gas) and repealing Directive 2003/54/EC (2003/55/EC).

Agency, 2012). While TSOs transport gas on a national level, DSOs are responsible for delivering gas to the ultimate consumer.

Table 1. Composition of the Gas and Electricity Markets in Selected Countries

	Transmission		Distribution			
Country	Gas	Electricity	Gas	Electricity	Method	Agency
Germany	14	4	695	866	Incentive-regulation, revenue cap	BNetzA
UK	1	1	18	19	Incentive-regulation, price cap	Ofgem
France	2	1	25	148	Incentive-regulation, revenue cap	CRE
Italy	3	9	263	144	Incentive-regulation, price cap	AEEG
Spain	14	1	22	351	Incentive-regulation, revenue cap	CNE
Netherlands	1	1	10	8	Yardstick method	Energiekamer
Belgium	1	1	18	26	Incentive-regulation, revenue cap	CREG

The table contains the number of regulated gas and electricity companies as well as the national regulation agencies for major countries in the EU. The following list contains the full names of the above mentioned national regulation agencies. Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahnen (BNetzA), Office of Gas and Electricity Markets (Ofgem), Commission de Régulation de l'Energie (CRE), Autorità per l'Energia Elettrica e il Gas (AEEG), La Comisión Nacional de Energía / National Energy Commission (CNE), Office of Energy Regulation (Energiekamer), Commission pour la Régulation de l'Electricité et du Gaz (CREG).

In Germany, the German Federal Network Agency (Bundesnetzagentur*, BNetzA*) uses an incentive-regulation (Anreizregulierungsverordnung*, ARegV)* to achieve a further decrease in prices in the electricity and gas utility industry. It became effective in 2009 (§ 3 (1) ARegV), replacing the former cost-plus regulation. It defines firm-year-specific revenue caps for specified regulation periods and includes a benchmarking mechanism. Per unit prices are determined by dividing revenue caps by expected quantities sold. If within a year more (less) quantities are sold compared to expected values, the difference decreases (increases) the revenue cap for the following year. This mechanism ensures that the sum of actual revenues equals the sum of revenue caps.

Costs are only fully covered if companies work efficiently compared to a benchmark (§ 4 (1) GasNEV). The first regulation period of the gas industry started in 2009 and ended in 2012 (§ 34 (1b) ARegV). The second regulation period started in 2013 and will last until 2017. Each of the subsequent periods will also last five years. Firm-specific revenue caps are calculated in the following way (simplified formula).

$$R_t = C_{ni,t} + \left(C_{efficient,2010} + C_{inefficient,2010} * (1 - IIR_t)\right) * \left(\frac{CPI_{t-2}}{CPI_{2010}} - GR_t\right) \quad (1)$$

The regulator assumes that there are costs that can be influenced if the utility network is operated efficiently and costs that cannot be influenced by the company. Therefore, the regulation differentiates between influenceable and non-influenceable costs. Costs that are classified as non-influenceable ($C_{ni,t}$) are included in the revenue cap for every specific year. Examples of these costs are certain taxes and grid fees which can be seen as exogenous to the choice of managers (§ 11 (2) ARegV). All other operational expenses related to the operation of the networks are classified as influenceable costs (§ 11 (3) ARegV). To incentivize firms to operate and invest in the utility networks, a return on equity is also added to the influenceable costs.

In order to provide incentives to decrease costs, influenceable costs of the base year are compared to benchmark efficiencies. Based on the comparison, influenceable costs are divided into efficient and inefficient costs (§ 14 ARegV). The portion of influenceable costs that does not exceed the benchmark is classified as efficient costs ($C_{efficient}$). Costs exceeding the benchmark are classified as inefficient costs ($C_{inefficient}$). During the regulation period the revenue cap decreases for two reasons. First, efficient and inefficient costs are not fully covered due to a general reduction of 1.5% (GR_t). The general reduction will reduce revenues of all companies irrespective of their individual efficiency level. Second, inefficient costs are only partly covered because of an individual inefficiency reduction (IIR_t). At the beginning of a regulation period the inefficient costs are fully covered but the amount decreases in steps of 20% to zero within a regulation period. *CPI* (consumer price index) adjusts for inflation.

The return on equity is calculated as a return on *regulatory* equity. The interest rate is 7.14% for investments before January 1st 2006 and 9.05% for investments thereafter (Bundesnetzagentur, 2011b). Regulatory equity differs from book value of equity. It is

computed as the average value of network-related property, plant, and equipment (PPE) (§ 7 (1) GasNEV, §§ 4, 6 (1), 11 ARegV) minus network-related liabilities (§ 7 (2) GasNEV, §§ 4, 6 (1), 11 ARegV). According to § 6b EnWG the relevant values both of network-related PPE and network-related liabilities are based on accounts that have to be prepared in accordance with German GAAP. Influenceable costs are determined during a cost audit in a specified year (referred to as the base year). In the gas industry the base year for the second regulation period (2013-2017) is 2010 (§ 34 (5) ARegV). Table 2 summarizes the different cost types as well as the corresponding method for inclusion in the revenue cap.

Table 2. Cost Types and the Inclusion into Revenue Caps

Cost type	Classification	Cost base	Inclusion in revenue cap
Network-related costs exogenous to the choice of managers (e.g. grid fees, certain taxes)	Non-influenceable costs	Actual costs of the specific year	Full inclusion
All other network-related costs	Influenceable costs	Based on costs during the base year (here: 2010)	Only partial inclusion due to general reduction and individual inefficiency reduction
Return on regulatory equity	Influenceable costs	Based on fixed interest rate on regulatory equity (here: average of 2009 and 2010)	Only partial inclusion due to general reduction and individual inefficiency reduction

The table provides the different cost types according to the German incentive-regulation and the respective inclusion in the revenue caps.

3. Hypotheses

The voluntary adoption of new German GAAP provides a unique setting to contribute to the understanding of regulatory consequences of accounting choices. The decision to voluntarily adopt new accounting standards depends on the expected costs and benefits. For financial years starting in 2009 the German legislature permitted firms to voluntarily adopt new German GAAP early (early adopters). In financial years starting in 2010 firms are required to follow new German GAAP (non-adopters). Voluntary early adoption is costly for several reasons: Companies (i) are faced with information gathering for one additional year

(e.g. detailed disclosure for pension provisions, audit fees and deferred taxes), (ii) have less time to educate their accounting staff and (iii) have less experience in the application of the new rules and therefore face higher risk due to legal uncertainty.

As stated in Section 2.2, revenue caps comprise operational expenses as well as a return on regulatory equity. The rate (percentage) is fixed and defined by the regulator. Because the calculation is based on financial statement data, managers can have incentives to increase revenue caps by influencing accounting figures. If a company is able to increase the level of regulatory equity through exercising accounting discretion ($\Delta REGEQUITY_{2010,discretion}$), the additional return will increase the revenue cap. The magnitude of the change depends on the individual efficiency level of the company. If it is still efficient after the inclusion of the higher return on regulatory equity compared to the industry benchmark, the additional return on regulatory equity is fully incorporated. It increases revenues without individual efficiency reduction (IIR_t) in the following way:

$$\Delta R_{t,discretion} = 0.5 * \Delta REGEQUITY_{2010,discretion} * i * \left(\frac{CPI_{t-2}}{CPI_{2010}} - GR_t \right) \quad (2)$$

The factor 0.5 is included because regulatory equity is calculated as the average of year-beginning and year-end 2010. The voluntary adoption of new German GAAP only affects year-end 2009 (and therefore year-beginning 2010) because in 2010 adoption of new German GAAP is mandatory for all companies. Thus, we make sure that we only capture the incremental effect of early adoption. If a company is not able to reach an efficiency level of 100% in the base year, the additional return on equity is part of the inefficient cost ($C_{inefficient}$). The individual efficiency reduction (IIR_t) will decrease the effect within the regulation period. In this case, the revenue change is:

$$\Delta R_{t,discretion} = 0.5 * \Delta REGEQUITY_{2010,discretion} * i * (1 - IIR_t) * (\frac{CPI_{t-2}}{CPI_{2010}} - GR_t) \quad (3)$$

New German GAAP influences financial statement data used for the calculation of revenue caps in several ways. For example under old German GAAP network-related liabilities could contain provisions for future internal costs. New German GAAP prohibits such provisions. If such provisions were recognized under old German GAAP, managers have the choice either to keep these provisions or to reclassify them directly into equity (article 67 (3) EGHGB). Therefore, regulated companies could have the possibility to increase their regulatory equity in the base year and thus their revenue caps.[7] On the other hand, early adoption could decrease future prices as well. New German GAAP requires future salary and pension increases to be included in the calculation of pension provisions, which was voluntary according to old German GAAP. A resulting increase in pension provisions will decrease regulatory equity and in turn decrease future prices. Figure 1 illustrates the effect of a possible increase in future prices due to the early adoption of new German GAAP.

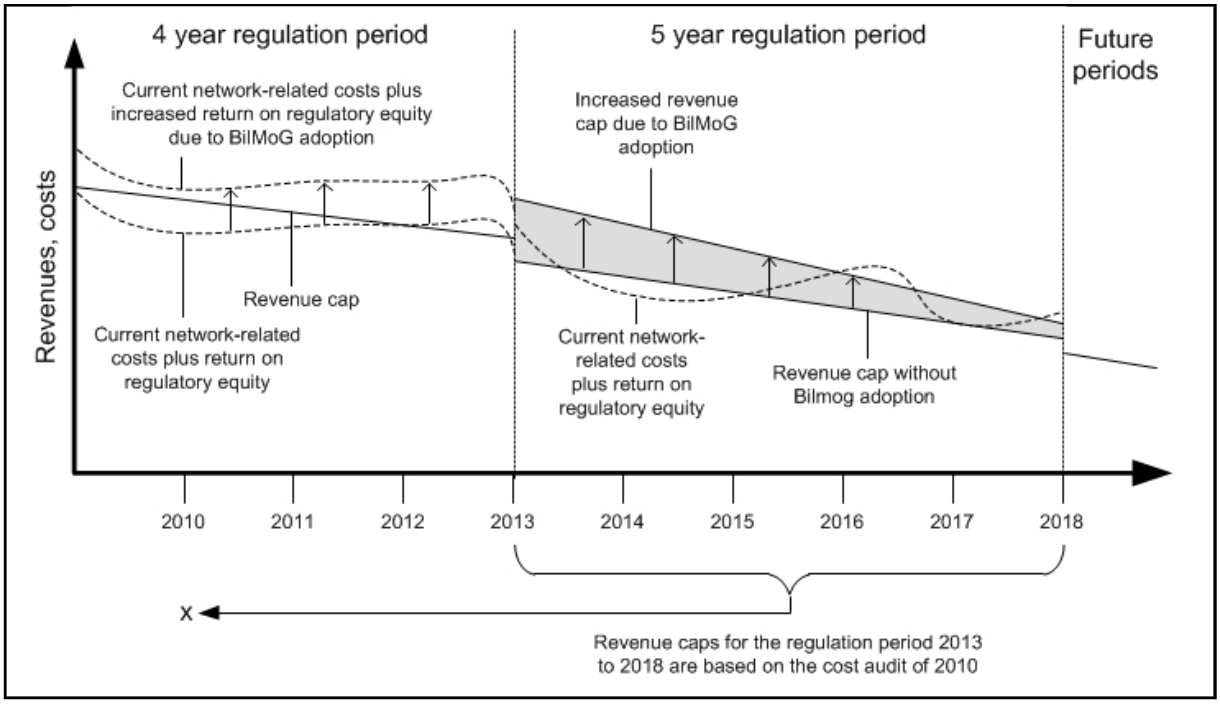
In general, firms will make profits if their actual costs are below the revenue cap and losses if their costs are above. If firms are able to increase their revenue caps for the regulation period 2013 to 2017, this increase will lead to higher per unit prices. Prices are calculated as revenue cap divided by (expected) quantities. Because the return on regulatory equity is independent from the quantities sold, the increase in revenue will affect the profitability of the respective company by the same amount. If sales volume reacts to price changes, there will be modifications within the revenue cap formula.[8] Therefore, after

[7] Early adopting firms are not able to expense provisions for maintenance expense in the year of the cost audit. These expenses for provisions are not part of the cost to calculate the revenue cap for the second regulation period. Thus, there is not counter effect which could decrease future prices.

[8] A regulation account balances the revenues through the years of the regulation period if actual earnings exceed or fall below the allowed revenues. Furthermore, enduring demand changes are balanced by an expansion factor.

deducting additional costs of early adoption, the increased revenue caps directly convert to increased (pre-tax) profits for the regulation period 2013 to 2017.

Figure 1. Interplay of new German GAAP and the Incentive-Regulation of Gas Network Providers



Ex ante it is unclear whether firms will early adopt new German GAAP since it could increase or decrease future regulated prices. Firms will only adopt if the future prices exceed the costs of early adoption. We state our first hypothesis in the following form:

H1. Across industries, firms from the incentive-regulated gas utility industry are more likely to adopt new German GAAP early.

There are reasons for regulated companies not to choose voluntary adoption. It might be that not all regulated companies are able to increase (or they even decrease) their regulatory equity or the change in revenue caps is only marginal and does not outweigh the costs of early adoption. Conditional on that we confirm our first hypothesis, we therefore hypothesize:

H2. Within the incentive-regulated industry, the propensity to voluntarily adopt new German GAAP increases with the potential to increase regulatory equity.

4. Sample Selection and Research Design

4.1 Sample Selection

We identify voluntary adopters of new German GAAP using a full-text search in the Electronic Federal Gazette, where annual reports of German companies have to be published online. Since all companies have to disclose if they adopt new German GAAP in 2009 (article 66 (3) EGHGB), we are able to explicitly identify all early adopters. We restrict the search to large and medium-sized entities as defined by German GAAP, since small companies do not have to publish profit and loss statements and external auditing is not mandatory. In total we found 344 large and medium-sized voluntary adopters of new German GAAP. We exclude banks and insurance companies (18) and non-profit organizations (8) because of their different capital structure and different reporting incentives respectively. Furthermore, we exclude publicly listed firms (58). The rationale for this is that network services are provided by legally separated firms (Directive 2003/54/EC, article 15). To rule out that incentives from public and private firms interfere, we limit our sample to private firms. After removing firms with missing data (28) our sample consists of 232 voluntary adopters. We randomly selected the same number of non-adopters to obtain a control sample.[9] The data is hand collected from the financial statements and from the notes. Table 3 shows that our control sample is fairly representative of the overall industry distribution in Germany.[10] Furthermore, the table also reveals that the industry "Energy Supply", which contains the incentive-regulated companies,

[9] In total roughly 1.1 million annual reports are listed on the Electronic Federal Gazette on 11,466 pages, each of these containing 100 annual reports. We randomly selected these pages and chose the first company which fulfilled the criteria of not being small according to German GAAP.

[10] Our sample consists of companies which are classified as being not small according to German Commercial Code, which means that they exceed two of the following thresholds in two consecutive years: (1) 4,840,000 Euro total assets, (2) 9,680,000 Euro sales and (3) 50 employees (§ 267 (1) HGB). The German Federal Statistical Office provides data only according to turnover and employees. Therefore, we compare our sample to both thresholds.

is over-representative in the treatment sample compared to the control sample and the overall industry distribution.

Table 3. Industry Distribution

	$EARLY_t = 0$		$EARLY_t = 1$		Industry distribution (rel.)	
Industry	N	rel.	N	rel.	> 10 m sales	>50 empl.
Agriculture and Forestry	8	0.03	3	0.01	n.a.	n.a.
Mining	0	0.00	0	0.00	0.00	0.00
Manufactoring	87	0.38	84	0.36	0.31	0.29
Energy Supply	**20**	**0.09**	**45**	**0.19**	**0.03**	**0.01**
Water Supply	2	0.01	10	0.04	0.02	0.01
Building Industry	14	0.06	16	0.07	0.05	0.05
Trade and Maintenance	49	0.21	28	0.12	0.36	0.14
Traffic and Storage	11	0.05	7	0.03	0.05	0.05
Hotel and Restaurant	1	0.00	1	0.00	0.01	0.03
Information and Comm.	6	0.03	14	0.06	0.04	0.04
Finance and Insurance	1	0.00	1	0.00	0.01	0.03
Real Estate	4	0.02	1	0.00	0.03	0.01
Independent Profession	6	0.03	6	0.03	0.05	0.05
Other Economic Services	8	0.03	7	0.03	0.03	0.08
Civil Services and Defense	0	0.00	0	0.00	n.a.	n.a.
Education	1	0.00	0	0.00	0.00	0.03
Health Care	8	0.03	5	0.02	0.02	0.14
Art and Entertainment	4	0.02	1	0.00	0.00	0.01
Other Service	2	0.01	3	0.01	0.01	0.03
Total	232	1.00	232	1.00	1.00	1.00

This table reports the industry distribution of our sample partitioned by *EARLY* and the overall German industry distribution by sales and employees. Our sample requires companies to be classified as at least medium sized according to the German Commercial Code. This means that they exceed two of the following thresholds in two consecutive years: (1) 4,840,000 Euro total assets, (2) 9,680,000 Euro sales and (3) 50 employees (§ 267 (1) HGB). The overall German industry distribution (of 2009) is presented for firms which have at least 10 million Euro of sales or more than 50 employees respectively and is based on data provided by the German Federal Statistical Office. This dataset does not provide data for the industries "Agriculture and Forestry" and "Civil Services and Defense". *EARLY* is coded one if the company voluntarily adopted new German GAAP in 2009 and zero otherwise.

Additionally, we draw a random control sample of 100 incentive-regulated gas companies which did not adopt new German GAAP early. The sample selection is based on a list provided by the German Federal Network Agency that contains all incentive-regulated German companies (Bundesnetzagentur, 2011a).

4.2 Research Design

We analyze the determinants of voluntary adoption of new German GAAP by using a logistic regression design. The dependent variable $EARLY_t$ is coded one if a company is an early adopter and zero otherwise. The models are designed as follows:

$$\text{prob}\{EARLY_t = 1\} = \text{logit}(\beta_0 + \beta_1 * GAS_t + \beta_i * Controls) \quad (4)$$

Incentive-regulation: To test our hypotheses we generate a dummy variable GAS_t which is coded one (zero) if the company is (not) within the incentive-regulated gas utility industry. We are able to identify firms which are incentive-regulated based on the list provided by the German Federal Network Agency. Besides the variable of main interest, we include variables for other incentives influencing the probability of early adopting new German GAAP.

Ownership structure: We assume that companies with a more dispersed ownership structure could have an incentive to voluntary adopt new German GAAP early. More market based accounting principles and increased disclosure can potentially be used to reduce information asymmetries between managers and non-controlling owners. Whereas controlling investors can gain insights into the economic situation of the firm using private information channels, non-controlling investors are to some extent more dependent on accounting information (Beatty and Harris, 1998). Ownership information is gathered from the Hoppenstedt database. We include $CLOSEH_t$ as a dummy variable that is coded one if the company has one investor with voting power over 50%.[11]

Taxation: The changes of new German GAAP do not affect the tax base since tax specific regulations offset these changes. Nevertheless, book-tax conformity was abandoned and tax induced incentives to early adopt might indirectly arise because of tax-related

[11] Hoppenstedt database provides ownership data of 459 companies of our overall sample of 564 companies. We analyze private firms and assume that most private firms are held by one controlling investor. Where ownership data is available 86.3% of the companies have a controlling investor. Thus, we code $CLOSEH_t$ one for companies that are not available in Hoppenstedt.

incentives before adoption. Thus, firms with strong tax-related incentives before adoption of new German GAAP might benefit more from early adoption because discretion can now be exercised with less influence on taxes. We include the local tax factor (*Gewerbesteuerhebesatz*) as a proxy for tax incentives ($TAXRATE_{t-1}$). The local tax factor varies by the municipality where the company is located. We assign the respective local tax rate of the year before there was the option to adopt new German GAAP early. The data is provided by the German Federal Statistical Office (Statistisches Bundesamt, 2009).

Debt contracting: Capital structure is an important element in debt covenants and within a bank's internal rating process (e.g. Beneish and Press, 1993). Managers may have an incentive to improve their capital structure by adopting new German GAAP. New German GAAP provides managers with various instruments to increase equity. Banks with rational expectations should anticipate such behavior in a way that they exclude accounting changes from the calculation of debt covenants (Mohrman, 1996). In contrast to this assumption, Dichev and Skinner (2002) find that only some banks in fact exclude accounting method changes from the calculation of debt covenants. $EQUITY_{t-1}$ is book value of equity deflated by total assets. As there might be other capital structure-related and debt financing-related incentives to adopt new German GAAP early, we include the dummy variable $BANKDEBT_t$, which is a dummy variable coded one if the company has liabilities to banks and zero otherwise

Affiliation: There might also be substantial differences in the incentive structure of stand-alone companies and companies belonging to a group. Incentives to adopt new German GAAP at group level might interfere with those of the subsidiary. Therefore, we include the dummy variable $GROUP_t$ in our analyses which is coded one (zero) if the company is (not) a member of a group.

Profitability: ROA_{t-1} is included to control for profitability, which is return on assets measured as EBIT divided by total assets at year-beginning. On the one hand, more profitable companies could use the adoption of new German GAAP to signal their good type (higher profitability). On the other hand, less profitable firms might be more likely to adopt new German GAAP to increase their equity ratio (e.g. by derecognition of specific provisions) and to increase net income (e.g. through new rules on currency translation).

Size effects: The implementation of new German GAAP should be relatively less costly for bigger firms compared to smaller firms. Providing disclosure incurs fixed costs and bigger firms are more likely to have prepared the data already for internal evaluation purposes (Singhvi and Desai, 1971; Dumontier and Raffournier, 1998). Furthermore, bigger firms require specialized accounting departments and thus it is more likely that they can respond faster to changes in accounting rules (Murphy, 1999). We measure $SIZE_{t-1}$ as the natural logarithm of total assets (in thousand Euro) at year-end.

Auditor: Prior literature documents that auditors play a significant role regarding the choice of accounting policies of firms (e.g. Singhvi and Desai, 1971). It is reasonable to expect that big audit firms are able to adapt faster to rule changes due to their large policy departments. Thus, the voluntary adoption of a new accounting regime could be driven by big auditing firms. $BIG5_t$ is a dummy variable coded one if a company is audited by one of the five dominating auditors in Germany (BDO, Deloitte, Ernst & Young, KPMG and PWC).

Earnings management potential: Especially derecognition of specific provisions (e.g. provisions for future maintenance expense) can increase book equity upon first time adoption of new German GAAP. We include $PROVISIONS_{t-1}$ to control for earnings management potential.

5. Empirical Findings

5.1 Determinants of Voluntary Adoption of new German GAAP across Industries

To examine whether regulated gas companies are more likely to adopt new German GAAP early, we investigate the incentives for early adoption across industries. Table 4 reports summary statistics of two subsamples divided by $EARLY_t$. In total, the sample consists of 464 companies, half of them are early adopters and half are randomly selected non-adopters. The number of incentive-regulated gas companies is roughly three times larger within the early adopters (15.5%) compared to the non-adopters (5.6%). This gives first indications that firms from the gas utility industry are more likely than other firms to voluntarily adopt new German GAAP early. On average the change in equity of the voluntary adopters is only slightly larger than that of the non-adopters.

Table 5 reports Pearson and Spearman correlations. GAS_t is significantly positively correlated with $EARLY_t$ and with both the change in equity and the size of a company. Furthermore, $EARLY_t$ is significant negatively correlated with the equity ratios of 2008 and 2009 and $CLOSEH_t$, and positively correlated with $BIG5_t$, $PROVISIONS_{t-1}$ and $TAXRATE_{t-1}$.

Table 6 presents the results of our multivariate analysis. The models use robust standard errors and industry fixed effects when indicated. We find a significant influence of GAS_t (two-sided p-value below 1%) on the probability to adopt new German GAAP early. Besides our main variable of interest we control for other incentives to voluntarily adopt new German GAAP in Model 2 and Model 3. $EQUITY_{t-1}$ and $CLOSEH_t$ are negatively significant at the 5% level. Furthermore, $TAXRATE_{t-1}$ is significant at the 5% level. Overall, our models support Hypothesis 1: Incentive-regulated gas companies are more likely to adopt new German GAAP early than firms from the control sample.

Table 4. Summary Statistics

$EARLY_t = 0$	N	Mean	Sd	Min	P25	Median	P75	Max
$EQUITY_{t-1}$	232	0.317	0.22	-0.13	0.16	0.28	0.45	0.87
$EQUITY_t$	232	0.342	0.24	-0.09	0.17	0.30	0.50	1.00
$\Delta EQUITY_t$	232	0.025	0.08	-0.28	0.00	0.01	0.04	0.54
ROA_{t-1}	232	0.102	0.12	-0.24	0.03	0.07	0.15	0.54
$SIZE_{t-1}$	232	10.070	1.31	7.78	9.04	9.89	10.89	14.01
$TOTASS_{t-1}$	232	69.342	164.37	2.39	8.44	19.73	53.63	1,208.88
$SALES_{t-1}$	232	67.911	164.09	0.22	7.20	18.99	55.16	1,221.82
$TAXRATE_{t-1}$	232	3.855	0.56	2.10	3.40	3.80	4.40	4.90
$PROVISIONS_{t-1}$	232	0.141	0.13	0.00	0.05	0.10	0.20	0.75
$BIG5_t$	232	0.254						
$BANKDEBT_t$	232	0.698						
$CLOSEH_t$	232	0.910						
GAS_t	232	0.056						
$GROUP_t$	232	0.470						
$EARLY_t = 1$	N	Mean	Sd	Min	P25	Median	P75	Max
$EQUITY_{t-1}$	232	0.259***	0.21	-0.13	0.11	0.22***	0.38	0.87
$EQUITY_t$	232	0.293**	0.23	-0.09	0.11	0.25**	0.43	1.00
$\Delta EQUITY_t$	232	0.034	0.09	-0.31	0.00	0.01	0.06	0.50
ROA_{t-1}	232	0.090	0.14	-0.24	0.03	0.07	0.13	0.61
$SIZE_{t-1}$	232	10.239	1.38	7.78	9.20	10.04	11.16	14.01
$TOTASS_{t-1}$	232	83.465**	177.98	2.39	9.87	22.89**	70.15	1,208.88
$SALES_{t-1}$	232	92.146	200.58	0.22	10.56	21.40	71.94	1,221.82
$TAXRATE_{t-1}$	232	3.968	0.55	2.40	3.50	4.03**	4.46	4.90
$PROVISIONS_{t-1}$	232	0.182***	0.16	0.00	0.07	0.14***	0.26	0.75
$BIG5_t$	232	0.341**						
$BANKDEBT_t$	232	0.711						
$CLOSEH_t$	232	0.853*						
GAS_t	232	0.155**						
$GROUP_t$	232	0.526						

The table reports the summary statistics of the full sample partitioned by *EARLY*. *EARLY* is coded one if the company voluntarily adopted new German GAAP in 2009 and zero otherwise. *EQUITY* is book equity divided by total assets both at year-end. *ΔEQUITY* is the change of book equity deflated by total assets at year-end. *ROA* is return on assets (EBIT/average of total assets at year-beginning and year-end). *SIZE* is the natural logarithm of total assets (in thousand Euro) at year-end. *TOTASS* is total assets at fiscal year-end in million Euro. *SALES* is sales in million Euro. *TAXRATE* is the tax factor applied by the municipality where the respective company is located. *PROVISIONS* is the total amount of provisions divided by total assets at year-end. *BIG5* is a dummy variable coded one if the company is audited by one of the dominating auditors in Germany (BDO, Deloitte, Ernst & Young, KPMG, PWC) and zero otherwise. *BANKDEBT* is a dummy variable coded one if the company has liabilities to banks and zero otherwise. *CLOSEH is* a dummy variable coded one if the company has one investor with voting power over 50% and zero otherwise. *GAS* is a dummy variable coded one if the company is in the incentive-regulated gas utility industry and zero otherwise. *GROUP* is a dummy variable coded one if the company is consolidated and zero otherwise. The subscript t marks values from financial years starting after January 1, 2009 (voluntary adoption period). The subscript t-1 marks values from financial years starting after January 1, 2008. All data is winsorized at the 1% and 99% level. ***/**/* marks significance at the 1/5/10% level based on the two tailed t-test of the mean, the chi2 test of the mean of the dichotomous variables and the Wilcoxon rank test of the median.

Table 5. Pearson and Spearman Correlations of the Full Sample

Variable	$EARLY_t$	$EQUITY_{t-1}$	$EQUITY_t$	$\Delta EQUITY_t$	ROA_{t-1}	$SIZE_{t-1}$	$TAXRATE_{t-1}$	$PROVISIONS_{t-1}$	$BIG5_t$	$BANKDEBT_t$	$CLOSEH_t$	GAS_t	$GROUP_t$
$EARLY_t$		-0.14***	-0.10**	0.05	-0.05	0.06	0.10**	0.14***	0.09**	0.01	-0.09*	0.16***	0.06
$EQUITY_{t-1}$	-0.14***		0.93***	0.08*	0.20***	0.10**	-0.04	-0.14***	-0.02	-0.03	0.02	-0.04	0.05
$EQUITY_t$	-0.11**	0.94***		0.44***	0.19***	0.08*	-0.03	-0.13***	-0.01	-0.04	0.01	0.00	0.02
$\Delta EQUITY_t$	0.05	0.08*	0.36***		0.05	-0.03	0.02	-0.03	0.02	-0.05	-0.01	0.10**	-0.08*
ROA_{t-1}	-0.05	0.25***	0.25***	0.07		-0.16***	-0.03	0.04	-0.05	-0.11**	-0.01	-0.14***	-0.08*
$SIZE_{t-1}$	0.06	0.12***	0.11**	-0.04	-0.18***		0.11**	-0.02	0.27***	0.12**	0.10**	0.26***	0.37***
$TAXRATE_{t-1}$	0.10**	-0.05	-0.04	0.04	-0.01	0.08		0.13***	0.11**	-0.21***	0.06	0.08*	0.18***
$PROVISIONS_{t-1}$	0.14***	-0.03	-0.02	0.05	0.16***	-0.03	0.09**		0.13***	-0.28***	-0.02	0.12**	0.07
$BIG5_t$	0.09**	-0.02	-0.02	-0.06	-0.08*	0.27***	0.12**	0.07		-0.22***	0.09**	0.10**	0.40***
$BANKDEBT_t$	0.01	0.01	0.00	-0.04	-0.05	0.11**	-0.23***	-0.24***	-0.22***		-0.09**	-0.04	-0.19***
$CLOSEH_t$	-0.09*	0.02	0.01	-0.03	-0.04	0.09**	0.06	-0.07	0.09**	-0.09**		0.02	0.37***
GAS_t	0.16***	-0.03	0.02	0.11**	-0.09*	0.24***	0.07	0.12**	0.10**	-0.04	0.02		0.09**
$GROUP_t$	0.06	0.04	0.00	-0.11**	-0.11**	0.37***	0.19***	0.04	0.40***	-0.19***	0.37***	0.09**	

The table provides Spearman correlations below the diagonal and Pearson correlations above the diagonal. In total the sample consists of 464 companies. *EARLY* is coded one if the company voluntarily adopted new German GAAP in 2009 and zero otherwise. *EQUITY* is book equity divided by total assets both at year-end. *ΔEQUITY* is the change of book equity deflated by total assets at year-end. *ROA* is return on assets (EBIT/average of total assets at year-beginning and year-end). *SIZE* is the natural logarithm of total assets (in thousand Euro) at year-end. *TAXRATE* is the tax factor applied by the municipality where the respective company is located. *PROVISIONS* is the total amount of provisions divided by total assets at year-end. *BIG5* is a dummy variable coded one if the company is audited by one of the dominating auditors in Germany (BDO, Deloitte, Ernst & Young, KPMG, PWC) and zero otherwise. *BANKDEBT* is a dummy variable coded one if the company has liabilities to banks and zero otherwise. *CLOSEH is* a dummy variable coded one if the company has one investor with voting power over 50% and zero otherwise. *GAS* is a dummy variable coded one if the company is in the incentive-regulated gas utility industry and zero otherwise. *GROUP* is a dummy variable coded one if the company is consolidated and zero otherwise. The subscript *t* marks values from financial years starting after January 1, 2009 (voluntary adoption period). The subscript *t-1* marks values from financial years starting after January 1, 2008. All data is winsorized at the 1% and 99% level. ***/**/* marks significance at the 1/5/10% level.

Table 6. Logistic Model of Early Adoption of new German GAAP

Variable	Model 1	Model 2	Model 3
GAS_t	1.130***	15.083***	13.593***
	(0.339)	(0.778)	(0.920)
$SAMEINDUSTRY_t$			1.060*
			(0.607)
$EQUITY_{t-1}$			-1.306**
			(0.551)
$GROUP_t$			0.195
			(0.252)
$BANKDEBT_t$			0.457*
			(0.271)
$CLOSEH_t$			-0.661**
			(0.315)
ROA_{t-1}			-0.404
			(0.912)
$SIZE_{t-1}$			0.003
			(0.095)
$TAXRATE_{t-1}$			0.447**
			(0.204)
$PROVISIONS_{t-1}$			1.163
			(0.841)
$BIG5_t$			0.282
			(0.259)
Industry fixed effects	No	Yes	Yes
LR chi2	11.13	418.32	273.54
Prob>chi2	<0.001	<0.001	<0.001
N	464	463	463

The table provides the results of the logistic regressions of the voluntary adoption of new German GAAP in 2009. The sample consists of 232 voluntary adopters and 232 randomly chosen non-adopters. The dependent variable *EARLY* is coded one if the company voluntary adopted new German GAAP in 2009 and zero otherwise. *GAS* is a dummy variable coded one if the company is in the incentive-regulated gas utility industry and zero otherwise. *SAMEINDUSTRY* is coded one (zero) if the respective company is (not) within the industry "Energy supply" but not incentive-regulated. *EQUITY* is book equity divided by total assets 2008. *GROUP* is a dummy variable coded one if the company is consolidated and zero otherwise. *BANKDEBT* is a dummy variable coded one if the company has liabilities to banks and zero otherwise. *CLOSEH is* a dummy variable coded one if the company has one investor with voting power over 50% and zero otherwise. *ROA* is return on assets (EBIT/average of total assets at year-beginning and year-end). *SIZE* is the natural logarithm of total assets (in thousand Euro) at year-end. *TAXRATE* is the tax factor applied by the municipality where the respective company is located. *PROVISIONS* is the total amount of provisions divided by total assets at year-end. *BIG5* is a dummy variable coded one if the company is audited by one of the dominating auditors in Germany (BDO, Deloitte, Ernst & Young, KPMG, PWC) and zero otherwise. The subscript *t* marks values from financial years starting after January 1, 2009 (voluntary adoption period). The subscript *t-1* marks values from financial years starting after January 1, 2008. Robust standard errors are provided within the brackets below the coefficients. All data is winsorized at the 1% and 99% level. ***/**/* marks significance at the 1/5/10% level.

To further control for the influence of a parent company, we verify whether regulated gas companies have the same ultimate owner. This could be potentially problematic as it might be that a single parent owns different subsidiaries and requires them to early adopt new German GAAP for reasons other than price regulation. We observe that the regulated gas companies have different ultimate owners. Therefore, we conclude that our results are not driven by ownership concentration.

To rule out that there are other industry-specific incentives besides the incentive-regulation we include a dummy variable which is coded one if the company is within the same industry but not incentive-regulated ($SAMEINDUSTRY_t$). These companies are gas or electricity providers but do not own distribution networks. We find that they have a slightly higher likelihood of early adopting new German GAAP compared to other firms. Nevertheless, there are only a few firms in the same industry and results have to be interpreted with caution.

It might be that the incentive-regulation itself requires companies to adopt new German GAAP early. We can address this concern in two different ways. First, we observe that the majority of regulated gas companies did not adopt early. Thus, we are confident that early adoption was not forced by the regulator. Second, if our results are driven by industry-effects then there should be no systematic differences within the industry with respect to the adoption decision. Energy network providers can be divided into gas network providers (GNP) and electricity network providers (ENP). Both groups belong to the same industry and face the same regulation except that the cost audit of GNP coincides with the early adoption period of new German GAAP whereas at ENP the cost audit is one year later. This means that only GNP can use early adoption of new German GAAP to increase revenue caps. Thus, ENP can serve as a natural control group as they only differ in respect that they cannot increase revenue caps by early adoption. In contrast to GNP, we do not observe any voluntary adopter

within the ENP group. We do not estimate a logit model on a sample of GNP and ENP firms since this will lead to a quasi-complete separation of data points due to the fact that there are no early adopters within the ENP group. When we run a Fisher exact test (Table 7) based on the resulting contingency test we find that the difference between GNP and ENP with respect to early adoption is highly significant (p-Value below 0.001).[12] Taken together, the fact that not a single ENP (out of 373 firms) adopted GAAP early provides strong evidence that the choice of GNP to adopt new German GAAP early is driven by regulatory effects and not by industry affiliation.[13]

Table 7. Contingency Table of Incentive-Regulated Firms (GNP & ENP)

	$GAS = 0$	$GAS = 1$	Total
$EARLY_t = 0$	373	687	1,060
$EARLY_t = 1$	0	36	36
Total	373	723	1,096

The table provides the number of gas and electricity network providers that adopted new German GAAP early and those that did not. *EARLY* is coded one if the company voluntarily adopted new German GAAP in 2009 and zero otherwise. GAS is a dummy variable coded one if the company is in the incentive-regulated gas utility industry and zero otherwise. The subscript t marks values from financial years starting after January 1, 2009.

5.2 Consequences of Voluntary Adoption of new German GAAP

To support our first hypothesis, we investigate whether voluntary adopters from the gas utility industry indeed benefit from early adoption of new German GAAP by increasing their regulatory equity. Panel A of Table 8 presents the total equity changes from 2008 to 2009. While the equity ratio of all early adopters increases on average by 3.4 percentage points, the equity ratio of regulated firms increases by 7.2 percentage points. Panel B of Table

[12] The number of firms in Table 7 differs from those in Table 1 because firms often have both a gas and a electricity distribution network.

[13] Nevertheless, it still might be that sample differences affect our results. Following this argument, our results would be impaired if we face a model that is mis-specified or if we have omitted variables in our model. A matching design might be appropriate to obtain control firms with similar characteristics. This matching could be done based on the determinants from the determinants model mentioned above (Table 6). The best match possible we can think of is a sample of firms which are similar not only by firm characteristics (e.g size, ROA, leverage, ownership structure) but also with the same business model and regulatory oversight (e.g. ENP). Theoretically, this test would be doable since (i) we know all voluntary adopters of new German GAAP and (ii) we are able to distinguish between GNP and ENP. Thus, we could match our sample of GNP with ENP with the same firm characteristics based on the determinants model. But again, similar to above, since there are no early adopters within the ENP, the treatment sample would consist solely of GNP and the control sample would solely consist of non-adopting ENP. Thus, a test would be self-evident and would confirm our results that GNP are more likely to adopt new German GAAP early.

8 shows the changes in equity that are attributable to adoption of new German GAAP. We observe an average increase of 2.0 percentage points for all early adopters and a 4.5 percentage points for regulated firms, respectively.

Table 8. Equity Changes

Panel A: Changes in Book Equity

$EARLY_t$	Sample	N	$EQUITY_{t-1}$	$EQUITY_t$	$\Delta EQUITY_t$
1	$GAS_t = 1$	36	0.262 (0.256)	0.334 (0.352)	0.072** (0.097)**
1	$GAS_t = 0$	196	0.258 (0.211)	0.285 (0.231)	0.027 (0.020)
1	Total	232	0.259 (0.224)	0.293 (0.254)	0.034 (0.031)
0	$GAS_t = 1$	15	0.270 (0.279)	0.289 (0.246)	0.019 (-0.033)
0	$GAS_t = 0$	217	0.321 (0.279)	0.346 (0.297)	0.025 (0.019)
0	Total	232	0.317 (0.279)	0.342 (0.297)	0.025 (0.018)

Panel B: Changes in Book Equity due to Adoption of new German GAAP

Sample	N	Mean	Sd	Min	P25	Median	P75	Max
Total	232	0.020***	0.057	-0.279	-0.001	0.000***	0.025	0.383
$GAS_t = 1$	36	0.045***	0.063	-0.011	0.004	0.017***	0.061	0.213

Panel C: Changes in Regulative Equity due to Adoption of new German GAAP

Sample	N	Mean	Sd	Min	P25	Median	P75	Max
$GAS_t = 1$	36	0.053***	0.065	-0.004	0.008	0.031***	0.071	0.215

Panel A provides means (medians) of book equity levels and book equity changes of the sample of early adopters of BilMoG. Panel B shows the changes in equity due to the adoption of BilMoG. Panel C provides regulatory equity changes attributable to BilMoG adoption. *EQUITY* is book equity divided by total assets 2008. *ΔEQUITY* is the change book of equity deflated by total assets 2008. *GAS* is a dummy variable coded one if the company is in the incentive-regulated gas utility industry and zero otherwise. The subscript *t* marks values from financial years starting after January 1, 2009 (voluntary adoption period). The subscript *t-1* marks values from financial years starting after January 1, 2008. The respective medians are provided in brackets. All data is winsorized at the 1% and 99% level. ***/**/* marks significance at the 1/5/10% level (difference of means and medians by *EARLY* in Panel A).

As the calculation of revenue caps is based on regulatory equity which differs from book value of equity, we analyze changes in regulatory equity. We cannot observe the total amount of regulatory equity because it is not disclosed. However, we are able to estimate changes in regulatory equity due to the adoption of new German GAAP. As stated in section 2.2, regulatory equity is computed as the two-year-average value of network-related PPE minus network-related liabilities. Disclosures in the notes regarding the first time adoption of new German GAAP allow us to estimate the change in regulatory equity ($\Delta REGEQUITY_{t,Early}$) in the following way:

$$\begin{aligned}\Delta REGEQUITY_{t,Early} = &-\Delta FIXEDASSETS_{t,Early} \\ &- \Delta PENSIONPROVISIONS_{t,Early} \\ &- \Delta OTHERPROVISIONS_{t,Early}\end{aligned} \tag{5}$$

Panel C of Table 8 presents the results of the change in *regulatory* equity caused by early adoption. We find that incentive-regulated firms increase regulatory equity on average by 5.3 percentage points. This supports our first hypothesis by showing that voluntary adoption of new German GAAP can be used to increase regulatory equity and thus revenue caps.

Based on the formulas (2) and (3) introduced in Section 2.2 we are able to calculate the effect of increased regulatory equity on revenue caps. The magnitude of the effects is dependent on the firms' efficiency levels. As we are not able to observe this level, we employ two scenarios. First, we assume that companies are not completely efficient. Therefore, we use Formula (3) to calculate the change in revenue caps at the interest rate of 7.14% (investments before January 1st 2006). Second, we assume that companies are efficient and use Formula (2) and the interest rate of 9.05% (investments after January 1st 2006). Therefore, we are able to calculate a bandwidth where the real change is somewhere in between.

We use the average inflation rate of Germany over the last ten years of 1.6% (Statistisches Bundesamt 2012) to calculate the changes in the consumer price index. The individual inefficiency reductions (IIR_t) of the years 2012 to 2017 range from 0 in year 2012 to 0.8 in year 2017 in steps of 0.2. The general reduction (GR_t) for the second regulation period is 1.5% per annum. We discount the change in revenue of the years 2013-2017 with the current inflation rate of Germany. The cumulated effect deflated by different variables is presented in Table 9.

Table 9. Regulatory Consequences of Adoption of new German GAAP

Panel A: Average Change in Revenue for Inefficient Companies

Year	2013	2014	2015	2016	2017
ΔR in thousand Euro (inefficient)	275.17	220.36	165.45	110.42	55.27
ΔR in thousand Euro (efficient)	348.78	349.14	349.51	349.89	350.29

Panel B: Discounted Change in Revenue (*EFFECT*) for Inefficient Companies

	N	Mean	Sd	Min	P25	P50	P75	Max
EFFECT in thousand Euro	36	775	1,741	-48	39	151	508	8,092
$EFFECT / EQUITY_{t-1}$	36	0.165	0.387	-0.006	0.002	0.009	0.055	1.644
$EFFECT / SALES_{t-1}$	36	0.007	0.016	-0.001	0.001	0.001	0.007	0.092

Panel C: Discounted Change in Revenue (*EFFECT*) for Efficient Companies

	N	Mean	Sd	Min	P25	P50	P75	Max
EFFECT in thousand Euro	36	1,623	3,646	-101	83	315	1,064	16,938
$EFFECT / EQUITY_{t-1}$	36	0.346	0.810	-0.013	0.005	0.020	0.116	3.441
$EFFECT / SALES_{t-1}$	36	0.014	0.034	-0.001	0.001	0.003	0.015	0.193

The table provides the estimated consequences of the voluntary adoption of BilMoG of incentive-regulated companies from the gas utility industry. ΔR is the change in the revenue cap due to the adoption of BilMoG. *EFFECT* is the cumulative increase of revenue caps from 2013 to 2017 due to the adoption of new German GAAP discounted to Dec. 31, 2009. *EQUITY* and *SALES* are the respective items from the balance sheet and profit and loss statement, respectively. The subscript t marks values from financial years starting after January 1, 2009 (voluntary adoption period). The subscript t-1 marks values from financial years starting after January 1, 2008.

The average revenue cap increase in the first year of the second regulation period is between € 275k and € 348k. Besides the costs of early adoption, the increase in revenues increases profits with the same amount (see section 2). The magnitude of this effect is dependent on the efficiency-level of the firm compared to a benchmark. If a company is not fully efficient, the amount decreases on a year by year basis between 2013 and 2017. In contrast, for an efficient network provider the amount stays constant. The bandwidth of the sum of discounted increase in revenues is on average between € 775k and € 1,623k for the 5-year regulation period. Neglecting the costs of early adoption, the profit scaled by equity of 2008 is between 16.5% and 34.6%; scaled by revenues it is 0.7% and 1.4%, respectively.

5.3 Determinants of Voluntary Adoption of new German GAAP within the Incentive-Regulated Gas Utility Industry

To gain a deeper understanding why not all incentive-regulated gas companies adopt BilMoG early, we compare our sample of incentive-regulated early adopters with a random control sample of 100 incentive-regulated non-adopters. In order to benefit from the adoption of new German GAAP, regulated firms need to be able to increase regulatory equity. We assume that the ability to increase regulatory equity is the main determinant to early adopt new German GAAP for regulated firms. As accounts only have to be translated in the year of adoption, the ability to increase regulatory equity is only observable for late adopters in 2010. We deem the change in regulatory equity ($\Delta REGEQUITY_{t+1}$) in the year of the mandatory adoption (2010) as a suitable proxy for potential changes in 2009 as the items affecting regulatory equity stay relatively constant over time. Unreported results show that the mean of total provisions, pension provisions and other provisions is not changing significantly.

Summary statistics are reported in Table 10. Comparing both samples, early adopters are more often part of a group (61.1% compared to 37.0%) and the change in book equity is more pronounced (7.2% compared to 1.2%). As stated in section 5.2, early adopters increase their regulatory equity on average by 5.3 percentage points. One year later, mandatory adopters increase their regulatory equity on average by just 0.6%. Mostly the change is almost zero or even negative.

Table 11 presents the correlation matrix of the incentive-regulated sample. $EARLY_t$ is positively correlated to both the changes in equity and in regulatory equity. Furthermore, $EARLY_t$ is negatively related to $EQUITY_{t-1}$ and $BANKDEBT_t$.

Table 10. Summary Statistics of the Incentive-Regulated Sample

$EARLY_t = 0$	N	Mean	Sd	Min	P25	Median	P75	Max
$EQUITY_{t-1}$	100	0.321	0.18	0.00	0.21	0.33	0.45	0.80
$EQUITY_t$	100	0.334	0.18	0.00	0.23	0.33	0.46	0.83
$\Delta EQUITY_t$	100	0.012	0.03	-0.17	0.00	0.01	0.02	0.19
$\Delta REGEQUITY_{t+1}$	100	0.006	0.03	-0.04	0.00	0.00	0.00	0.15
ROA_{t-1}	100	0.047	0.11	-0.53	0.03	0.06	0.09	0.22
$SIZE_{t-1}$	100	10.754	1.27	7.20	10.07	10.65	11.45	14.20
$TAXRATE_{t-1}$	100	3.850	0.45	2.90	3.50	3.90	4.25	4.70
$PROVISIONS_{t-1}$	100	0.154	0.15	0.01	0.05	0.10	0.19	0.85
$BIG5_t$	100	0.360						
$BANKDEBT_t$	100	0.780						
$CLOSEHt$	100	0.960						
$GROUP_t$	100	0.370						
$EARLY_t = 1$	N	Mean	Sd	Min	P25	Median	P75	Max
$EQUITY_{t-1}$	36	0.262*	0.20	0.00	0.08	0.26*	0.39	0.80
$EQUITY_t$	36	0.334	0.21	0.00	0.19	0.35	0.46	0.83
$\Delta EQUITY_t$	36	0.072***	0.08	0.00	0.01	0.04***	0.11	0.29
$\Delta REGEQUITY_t$	36	0.053***	0.06	0.00	0.01	0.03***	0.07	0.20
ROA_{t-1}	36	0.041	0.13	-0.47	0.03	0.07	0.10	0.22
$SIZE_{t-1}$	36	11.089	1.37	8.77	10.18	11.10	12.04	14.09
$TAXRATE_{t-1}$	36	4.077**	0.46	3.10	3.85	4.03**	4.50	4.90
$PROVISIONS_{t-1}$	36	0.230**	0.18	0.05	0.10	0.19***	0.28	0.86
$BIG5_t$	36	0.444						
$BANKDEBT_t$	36	0.583**						
$CLOSEH_t$	36	0.889						
$GROUP_t$	36	0.611**						

The table reports the summary statistics of the incentive-regulated sample partitioned by *EARLY*. *EARLY* is coded one if the company voluntarily adopted new German GAAP in 2009 and zero otherwise. *EQUITY* is book equity divided by total assets both at year-end. *ΔEQUITY* is the change of book equity deflated by total assets at year-end. *ΔREGEQUITY* is the change of regulatory equity deflated by total assets at year-end. *ROA* is return on assets (EBIT/average of total assets at year-beginning and year-end). *SIZE* is the natural logarithm of total assets (in thousand Euro) at year-end. *TAXRATE* is the tax factor applied by the municipality where the respective company is located. *PROVISIONS* is the total amount of provisions divided by total assets at year-end. *BIG5* is a dummy variable coded one if the company is audited by one of the dominating auditors in Germany (BDO, Deloitte, Ernst & Young, KPMG, PWC) and zero otherwise. *BANKDEBT* is a dummy variable coded one if the company has liabilities to banks and zero otherwise. *CLOSEH is* a dummy variable coded one if the company has one investor with voting power over 50% and zero otherwise. *GROUP* is a dummy variable coded one if the company is consolidated and zero otherwise. The subscript t marks values from financial years starting after January 1, 2009 (voluntary adoption period). The subscript t-1 marks values from financial years starting after January 1, 2008. The subscript t+1 marks values from financial years starting after January 1, 2010. All data is winsorized at the 1% and 99% level. ***/**/* marks significance at the 1/5/10% level based on the two tailed t-test of the mean, the chi2 test of the mean of the dichotomous variables and the Wilcoxon rank test of the median.

Table 11. Pearson and Spearman Correlations of the Incentive-Regulated Sample

Variable	$EARLY_t$	$EQUITY_{t-1}$	$EQUITY_t$	$\Delta EQUITY_t$	$\Delta REGEQUITY_{t/t+1}$	ROA_{t-1}	$SIZE_{t-1}$	$TAXRATE_{t-1}$	$PROVISIONS_{t-1}$	$BIG5_t$	$BANKDEBT_t$	$CLOSEH_t$	$GROUP_t$
$EARLY_t$		-0.14*	0.00	0.46***	0.46***	-0.03	0.11	0.22**	0.21**	0.08	-0.20**	-0.13	0.21**
$EQUITY_{t-1}$	-0.16*		0.95***	-0.12	-0.13	0.47***	0.12	-0.22***	-0.50***	-0.25***	0.33***	0.03	-0.14
$EQUITY_t$	0.00	0.94***		0.19**	0.06	0.49***	0.10	-0.23***	-0.46***	-0.27***	0.29***	-0.01	-0.16*
$\Delta EQUITY_t$	0.36***	0.02	0.25***		0.61***	0.07	-0.06	-0.01	0.13	-0.05	-0.13	-0.14*	-0.07
$\Delta REGEQUITY_{t/t+1}$	0.50***	-0.06	0.06	0.36***		0.08	0.05	0.03	0.28***	0.04	-0.17*	-0.10	-0.03
ROA_{t-1}	0.04	0.39***	0.42***	0.14	0.21**		0.21**	-0.09	-0.43***	-0.20**	0.39***	-0.09	-0.18**
$SIZE_{t-1}$	0.13	0.02	0.00	0.08	0.00	0.04		0.30***	0.00	0.19**	0.22***	-0.04	0.18**
$TAXRATE_{t-1}$	0.21**	-0.24***	-0.24***	0.04	-0.05	-0.03	0.31***		0.28***	0.19**	-0.19**	0.05	0.23***
$PROVISIONS_{t-1}$	0.27***	-0.46***	-0.39***	0.17**	0.26***	-0.05	0.07	0.26***		0.27***	-0.39***	0.04	0.13
$BIG5_t$	0.08	-0.28***	-0.29***	-0.11	0.06	-0.16*	0.19**	0.18**	0.22***		-0.17*	0.00	0.26***
$BANKDEBT_t$	-0.20**	0.31***	0.26***	-0.04	-0.15*	0.29***	0.17**	-0.20**	-0.34***	-0.17*		-0.08	-0.13
$CLOSEH_t$	-0.13	0.04	-0.02	-0.16*	-0.10	-0.14	-0.08	0.06	0.07	0.00	-0.08		0.22**
$GROUP_t$	0.21**	-0.13	-0.15*	-0.07	0.03	-0.22**	0.19**	0.23***	0.11	0.26***	-0.13	0.22**	

The table provides Spearman correlations below the diagonal and Pearson correlations above the diagonal. In total the sample consists of 136 companies. *EARLY* is coded one if the company voluntarily adopted new German GAAP in 2009 and zero otherwise. *EQUITY* is book equity divided by total assets both at year-end. *ΔEQUITY* is the change of book equity deflated by total assets at year-end. *ΔREGEQUITY* is the change of regulatory equity deflated by total assets at year-end. *ROA* is return on assets (EBIT/average of total assets at year-beginning and year-end). *SIZE* is the natural logarithm of total assets (in thousand Euro) at year-end. *TAXRATE* is the tax factor applied by the municipality where the respective company is located. *PROVISIONS* is the total amount of provisions divided by total assets at year-end. *BIG5* is a dummy variable coded one if the company is audited by one of the dominating auditors in Germany (BDO, Deloitte, Ernst & Young, KPMG, PWC) and zero otherwise. *BANKDEBT* is a dummy variable coded one if the company has liabilities to banks and zero otherwise. *CLOSEH is* a dummy variable coded one if the company has one investor with voting power over 50% and zero otherwise. *GROUP* is a dummy variable coded one if the company is consolidated and zero otherwise. The subscript *t* marks values from financial years starting after January 1, 2009 (voluntary adoption period). The subscript *t-1* marks values from financial years starting after January 1, 2008. The subscript *t+1* marks values from financial years starting after January 1, 2010. All data is winsorized at the 1% and 99% level. ***/**/* marks significance at the 1/5/10% level.

To analyze the determinants within the incentive-regulated gas utility industry we use a logistic regression design similar to Table 6. The results of Table 12 reveal that the change in regulatory equity is significantly influencing the probability to early adopt, indicating that only firms which are able to increase regulatory equity early adopt BilMoG. In line with our second hypothesis, our results suggest that non-adopters have less discretion to increase regulatory equity and the benefits of higher revenue caps do not outperform the costs of early adoption. For some firms we estimate the change in regulatory equity upon adoption to be even negative, resulting from increased pension provisions.

5.4 Total Regulatory Effect of new German GAAP

In the previous section, we estimate cash flow consequences of the *early* adopters of the gas utility industry. However, this is just the effect of the *early* adoption, not the effect of the adoption of new German GAAP per se. As stated above, regulatory equity is calculated as average of the 2009 and the 2010 amounts. Since in 2010 all companies have to comply with new German GAAP, early adoption only affects 2009. Consequently, we included the factor "0.5" to calculate the incremental effect of early adoption. Thus, the total effect of new German GAAP for early adopters is roughly twice the magnitude. Mandatory adoption in 2010 could also increase regulatory equity for mandatory adopters. Therefore, the overall effect of new German GAAP on regulated prices is that of early adopters and of mandatory adopters.

Based on the voluntary adopters and 100 late adopters from section 5.3 (see Table 7), we are able to estimate the *overall* effect of new German GAAP on gas prices for the regulation period from 2013 until 2017. In total, there are more than 700 firms in the gas utility industry which had to adopt new German GAAP in 2010. We estimate the increase in revenues of the second regulation period to be between 260 and 540 million Euro, depending

on the individual efficiency of the firms. Converting this number to a per household effect (approximately 40 million in Germany), the increase is between 6.44 and 13.60 Euro.

Table 12. Logistic Model of Voluntary Adoption of new German GAAP of the Incentive-Regulated Sample

Variable	Model 1	Model 2
$\Delta REGEQUITY_{t/t+1}$	26.156***	27.803**
	(9.609)	(11.351)
$EQUITY_{t-1}$		0.319
		(1.547)
$GROUP_t$		1.490***
		(0.543)
$BANKDEBT_t$		-0.745
		(0.649)
$CLOSEH_t$		-2.254**
		(0.869)
ROA_{t-1}		0.093
		(2.148)
$SIZE_{t-1}$		0.070
		(0.211)
$TAXRATE_{t-1}$		0.815
		(0.541)
$PROVISIONS_{t-1}$		0.249
		(1.645)
$BIG5_t$		-0.183
		(0.535)
LR chi2	7.41	20.10
Prob>chi2	0.006	0.028
N	136	136

The table provides the results of the logistic regressions of the voluntary adoption of new German GAAP in 2009. In total the sample consists of 136 companies. The dependent variable *EARLY* is coded one if the company voluntary adopted new German GAAP in 2009 and zero otherwise. *ΔREGEQUITY* is the change of regulatory equity deflated by total assets at year-end. *EQUITY* is book equity divided by total assets 2008. *GROUP* is a dummy variable coded one if the company is consolidated and zero otherwise. *BANKDEBT* is a dummy variable coded one if the company has liabilities to banks and zero otherwise. *CLOSEH is* a dummy variable coded one if the company has one investor with voting power over 50% and zero otherwise. *ROA* is return on assets (EBIT/average of total assets at year-beginning and year-end). *SIZE* is the natural logarithm of total assets (in thousand Euro) at year-end. *TAXRATE* is the tax factor applied by the municipality where the respective company is located. *PROVISIONS* is the total amount of provisions divided by total assets at year-end. *BIG5* is a dummy variable coded one if the company is audited by one of the dominating auditors in Germany (BDO, Deloitte, Ernst & Young, KPMG, PWC) and zero otherwise. The subscript *t* marks values from financial years starting after January 1, 2009 (voluntary adoption period). The subscript *t-1* marks values from financial years starting after January 1, 2008. The subscript t+1 marks values from financial years starting after January 1, 2010. Robust standard errors are provided within the brackets below the coefficients. All data is winsorized at the 1% and 99% level. ***/**/* marks significance at the 1/5/10% level.

This does not include 373 firms which solely have an electricity distribution network. For them the base year is 2011 and the mandatory adoption of new German GAAP is influencing year-beginning values of 2011, and thus average values of 2011 by one half. These firms are very similar to the gas distribution networks. It is likely that these firms use

accounting discretion upon mandatory adoption to increase regulatory equity as well. Overall, the effect of both utility industries is likely to be bigger.

6. Conclusion

We provide new evidence of the economic consequences of the adoption of a new accounting regime in regulated industries. We are able to estimate increases in regulated firms' revenue caps that are attributable to managers' decision to voluntarily adopt new German GAAP early. We find that firms from the incentive-regulated gas utility industry are more likely to early adopt new German GAAP. We provide evidence that these companies use the early adoption to increase future revenue caps and thus their profit. Despite having strong incentives, we observe that not all gas network providers adopt new German GAAP early. In order to explain the cross-sectional differences, we test incentives solely within the incentive-regulated gas utility industry. Compared to early adopters, we find that late adopters hold significantly less or no discretion to increase their revenue caps. We assume that for these companies it is not beneficial to adopt new German GAAP early because higher revenues do not outperform the costs of early adoption. In some cases, early adoption would have decreased profits. Although our sample of early adopters from the utility industry is comparably small compared to the whole industry, we argue that the overall economic effect of the introduction of new German GAAP is significant as well: More than 1,000 late adopters from the German utility industry (gas and electricity) had to adopt new German GAAP in 2010. We estimate the overall revenue increase for the gas utility industry to be between 260 and 540 million Euro (between 6.44 and 13.60 Euro per household).

Our main contribution to the existing literature is that we show the consequences of the interplay between regulated prices and a new accounting regime in the European utility industries. The respective EU regulation is effective in all 28 member states. Knowing these dependencies is crucial for any discussion about a further harmonization of accounting across

Europe, especially for private firms. Understanding these effects requires not only knowledge about local accounting regimes but also knowledge about industry-specific regulations, which are implemented across EU member states. Since the relevant legal documents are mostly not provided in English, we encourage domestic researchers to study the interplay between regulations of specific industries (e.g. gas, electricity, water, pipeline, and communication) and local GAAP in the context of a potential shift towards IFRS for SMEs.

Appendix A. Overview of Major Changes in German GAAP

Table A1. Overview of Major Changes in German GAAP

Old German GAAP	New German GAAP (BilMoG)	Book equity
Internally generated intangible assets		
Prohibition to capitalize research and development costs (§ 248 (2) HGB-Old).	Option to capitalize expenses incurred during the development phase of intangible assets (§ 255 (2a) HGB).	↑
Depreciation of fixed and intangible assets		
In certain circumstances use of tax based depreciation principles required (§§ 254 and 273 HGB-Old).	Depreciation principles determined only by economic substance rather than by tax rules (§ 253 (3) HGB).	↑/↓
Foreign currency translation in individual financial statements		
Asymmetric translation of foreign currency balances: Only realization of exchange losses.	Realization of exchange losses and gains for current assets and liabilities. Only realization of exchanges losses for non-current assets and liabilities (§ 256a HGB).	↑
Provisions		
Optional recognition of provisions for obligations that are not against third parties (e.g. future maintenance expense) (§ 249 HGB-Old).	Prohibition of provisions for obligations that are not against third parties other than expenses for repairs and maintenance during the first three months of the next fiscal year and expenses for removal of overburden that are expected during the whole next fiscal year (§ 249 HGB).	↑
Discounting of provisions only if they contain an interest rate component (§ 253 (1) HGB-Old).	Discounting of all long term provisions with discount rates based on returns of high class bonds (§ 253 (2) HGB).	↑
Often discounting of pension provisions using the discount rate of 6.0% that is applicable in tax law (§ 6 (3) EStG). No incorporation of future increases in salary and pension payments.	Discounting of all long term provisions with discount rates based on returns of high class bonds (§ 253 (2) HGB). Incorporation of future increases in salary and pension payments.	↓
Separate recognition of plan assets at historical cost.	Fair-value measurement of plan assets and offsetting with pension obligations (§ 246 (2) 2 HGB).	↑
Deferred taxes		
No recognition of deferred tax assets for tax loss carry forwards (prevailed opinion).	Option to recognize deferred tax assets for tax loss carry forwards (§ 274 (1) 4 HGB).	↑

The table contains an overview of key changes in German GAAP due to BilMoG. The sign ↑ marks expected increases of book equity. The sign ↓ marks expected decreases of book. The sign – marks no expected influence on book equity.

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Big Bath Accounting - The Bright Side of Managerial Overconfidence

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Abstract:

This paper empirically investigates the relationship between managerial overconfidence and write-offs following CEO turnover. Subsequent to managerial turnover, it is often observed that large one-time charges are used to decrease current earnings for the benefit of higher future earnings. This earnings management technique, commonly referred to as big bath accounting, facilitates the reaching of given future earnings targets. Overconfident managers overestimate their abilities and consequently have upwardly biased expectations concerning future firm cash flows. Based on this premise, we hypothesize that overconfident CEOs see less need to engage in an earnings bath following managerial change in order to boost future earnings. Our empirical results strongly confirm this hypothesis showing that earnings baths are significantly less frequent among overconfident CEOs. The abstinence from downward earnings manipulation by overconfident CEOs thereby constitutes one of the few documented examples of a bright side of managerial overconfidence.

Keywords: *Big bath accounting, earnings management, managerial characteristics, overconfidence*

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1. Introduction

Overconfidence has a bad reputation and, as it seems, for a good reason. Empirical evidence so far shows that decisions made by overconfident CEOs have mostly adverse consequences for their firms' stakeholders. Malmendier and Tate (2008), for instance, show that overconfident CEOs are more active but less successful in the M&A market. Schrand and Zechman (2012) provide evidence that overconfident CEOs engage in fraudulent financial reporting.[1] However, are there also circumstances when managerial overconfidence can be beneficial? Contrary to the general notion, we argue that CEO overconfidence can also have a positive flavor by showing that when overconfident executives are hired, they are less likely to use write-offs to manipulate earnings.

Subsequent to CEO turnover, it is often observed that incoming CEOs use large write-offs and attribute these losses to their predecessors. This behavior is commonly known as taking a big bath, highlighting the magnitude of these write-offs. Big bath accounting thereby represents a manipulation intended to shift earnings to the future where gains are attributed to the new CEO. Overconfident CEOs, however, underestimate the benefits of this behavior because they overestimate future earnings in line with their behavioral bias (i.e., they believe that they will reach their earnings targets regardless of a potential earnings bath).[2] However, even though overconfident CEOs place a lower value in engaging in big bath accounting, they might still be inclined to do so if it would not be accompanied with any risks or costs. Yet, there are large potential costs associated with this type of earnings management. Desai et al. (2006), for instance, document serious labor market consequences for managers after earnings

[1] Other papers that document negative consequences of CEO overconfidence include Malmendier and Tate (2005) and Adam et al. (2014). Malmendier and Tate (2005) show that overconfident CEOs decrease investment in positive NPV projects when they have to rely on external finance and Adam et al. (2014) document that overconfident CEOs are more likely to use performance sensitive debt and perform worse after the issuance of these debt contracts.

[2] Analysts seem to be unable to consistently predict earnings management and thus cannot use this behavior in their forecasts (Burgstahler and Eames, 2003).

restatements.[3] Dechow et al. (1996) and Hribar and Jenkins (2004) show that firms face large capital market costs after revelations of earnings manipulation.[4] Consequently, managers face a trade-off between potential costs and benefits in the decision to engage in earnings manipulations. As overconfident managers place a lower value on the benefits of big bath accounting, we expect them to be less likely to engage in such activities in the year of the turnover.

We empirically investigate this prediction by examining CEO turnover of large U.S. companies.[5] Hereby, we use the ExecuComp database to build up managers' executive stock option portfolios following Yermack (1995) and Hall and Liebman (1998) in order to identify CEOs as either overconfident or rational. The methodology is based on Malmendier and Tate (2005). Managers are classified as overconfident if they ever hold an option until maturity which is at least 40 percent in-the-money at the year-end prior to maturity. The rationale behind this is that executives are typically poorly diversified and should exercise executive options as soon as possible in order to reduce their exposure to firm-specific risk. We merge the data on managerial overconfidence with control variables from Compustat and Lexis Nexis.

Our results provide strong support for our empirical prediction. We show that firms engage less in big bath accounting after hiring an overconfident CEO. Following Elliott and Shaw (1988), we use the magnitude of write-offs in the form of special items to measure big

[3] These consequences include a significantly larger probability of being replaced as well as poorer prospects for future employment.
[4] Hribar and Jenkins (2004) found large increases in the cost of capital after earnings restatements. Dechow et al. (1996) report a large decline in market value, increased bid-ask spreads, a drop in analysts following, and an increase in the dispersion of analysts' forecast after earnings manipulation has been made public.
[5] We focus on big bath accounting around turnover for several reasons. First, empirical evidence indicates that big bath accounting is used more frequently around CEO turnover (Johnson et al., 2011). Second, big bath accounting is not only used more frequently but it is also more extreme around turnover (Strong and Meyer, 1987). Third, the turnover setting allows us to control for time invariant unobservable firm characteristics that might endogenously determine the use of big bath accounting. Fourth, big bath accounting during turnover allows the incoming CEO to blame poor performance on the predecessor, while taking credit for future increases in performance. This benefit is not available for big bath accounting outside of a turnover setting.

bath accounting and find that overconfident CEOs use fewer negative special items to decrease earnings in the turnover year.

An alternative explanation could be that there is a self-selection of overconfident managers into firms with lower potential for large write offs in the turnover year. We address this potential endogeneity concern in several ways. First, we show that the observed differences between the two manager types are not driven by the fact that a management change is routine or non-routine. Big bath accounting has been shown to be especially prevalent in non-routine turnover (Pourciau, 1993; Wells, 2002). Thus, by controlling for and conditioning on the turnover type we rule out the possibility that our results are driven by a self-selection of overconfident CEOs into routine turnover. Second, we use a propensity score matching (PSM) design in which the first stage models the choice to hire an overconfident manager. This mitigates concerns that firm characteristics simultaneously explain the choice to hire a CEO of a certain behavioral type and determine the predicted big bath accounting pattern. Third, we run a second propensity score matching model based on firms with similar potential for large write offs in the turnover year. The matching results rule out that our findings are driven by a selection of rational CEOs into firms with overvalued assets and consequently higher big bath accounting potential. And fourth, we ensure that our results are not driven by overconfident CEOs failing to execute justified large write offs in the turnover year. If that was the case, a necessary restructuring would be only delayed, leading to a greater likelihood of large write off usage in future periods. Our results indicate that this is not the case.

Our contribution to the literature is twofold. First, we contribute to the literature by revealing a new factor that shapes large write-offs following CEO turnover: Overconfident CEOs are less likely to engage in big bath accounting. The existing literature on earnings management at CEO turnover documents that incoming managers take a big bath and write

off assets to ascribe negative outcomes to their predecessors (Murphy and Zimmerman, 1993). To the best of our knowledge, we are the first to link this behavior to managerial traits.

Second, the finding that overconfident CEOs are less likely to manipulate earnings via big bath accounting is one of the first examples that managerial overconfidence can be beneficial. We are aware of two other empirical papers highlighting positive effects of managerial overconfidence: Hirshleifer et al. (2012) demonstrate that overconfident CEOs are better innovators, while Campbellet al. (2011) show that moderate overconfidence leads to first-best investment decisions.

Besides us, few studies have analyzed the influence of CEO overconfidence on accounting policies.[6] Schrand and Zechman (2012) document that overconfidence is related to financial misreporting and fraud and Hribar and Yang (2013), Libby and Rennekamp (2012), and Hilary and Hsu (2011) show that overconfident managers are more likely to engage in management forecasts and that their forecasts are more specific and optimistic. Ahmed and Duellmann (2013) find that firms managed by overconfident CEOs use less conservative accounting and delay loss recognition.

The remainder of this paper is organized as follows. Section 2 develops our empirical hypothesis. Section 3 introduces the research methodology. In section 4 we interpret our results and section 5 presents robustness tests. Section 6 concludes.

2. Hypothesis Development

Overconfident managers systematically overestimate their abilities and consequently the future cash flows they are able to generate with their firms.[7] This implies that they place a

[6] Some papers relate other personal characteristics of CEOs to accounting policies. For example, Francis et al. (2008) show that firms with more reputable CEOs have poorer earnings quality.
[7] The terms overconfidence and optimism have been used inconsistently in the literature. We define managerial overconfidence to mean that the executive consistently overestimates the firm's future expected cash flows.

higher value on the company than rational market participants.[8] Ahmed and Duellmann (2013) show that the perceived superior ability by overconfident manager induces them to choose less conservative (i.e., more aggressive) accounting.

However, we argue that managerial overconfidence has additional effects on accounting choices which do not necessarily result in more aggressive accounting. In particular, we are interested in management actions following CEO turnover. Pourciau (1993) finds that incoming managers decrease earnings in their first year in order to report higher earnings in the following years and ascribe these write-offs to the former manager. This behavior is commonly known as "taking a big bath", highlighting the magnitude of these write-offs. We argue that overconfident managers are less likely to take a big bath. Taking a big bath is beneficial for incoming CEOs as they will be able to report increased earnings in the future. The cost of taking a big bath, however, is that the firm (i) has to provide additional information about the respective special item, (ii) exhibits increased SEC scrutiny, (iii) has less accounting flexibility in future years, (iv) will have excessive negotiation with the auditor and (v) faces severe labor market and capital market costs when the earnings manipulation is made public.[9] Therefore, the incoming CEO faces a trade-off between costs and benefits of big bath accounting. Overconfident CEOs overestimate their ability relative to other managers (e.g., their predecessors) and consequently believe that the company's projects will realize higher earnings in the future when these projects are managed by them. Therefore, they are certain of reaching their earnings targets (e.g., avoid the zero benchmark, meet and beat analysts' or management forecasts, reach bonus payment thresholds, etc.) and thus

[8] The perceived increase in firm value is thereby independent of whether or not the incoming CEOs have already exerted effort in managing the firm. Current firm value reflects the discounted stream of expected future cash flows. Thus, as overconfident managers have upwardly biased beliefs with respect to future cash flows, the value they place on the company immediately exceeds the current market value.

[9] See for example Dechow et al. (1996), Desai et al. (2006) and Hribar and Jenkins (2004). Hereby SEC scrutiny is not limited to upward earnings manipulations. Badertscher et al. (2009) for instance report that about 20 percent of firms with misstated reports that resulted in SEC investigation used income decreasing manipulations. In Nelson et al. (2003) the percentage of income decreasing earnings management approaches detected by auditors even amounts to 38 percent.

underestimate the necessity of increasing future earnings by large write-offs today. Thus, overconfident managers do not believe that the benefits will outweigh the costs and are less likely to engage in big bath accounting.

HYPOTHESIS. Incoming overconfident CEOs are less likely to engage in big bath accounting compared to incoming rational CEOs.

One potential concern might be that overconfident managers might still have an incentive to use big bath accounting as this leads to an even larger increase in future earnings and consequently even to an over-achievement of pre-set earnings targets.[10] However, over-achievement of these targets is typically unfavorable as this might entail an upward revision of future requirements such as higher earnings targets or higher bonus payment thresholds according to Weitzmann (1980) (ratchet effect). Empirical research is generally consistent with this conjecture and shows for instance that firms manage earnings to closely match analyst forecasts (Dechow and Skinner, 2000), to report positive earnings (Burgstahler and Dichev, 1997) or to meet bonus payment thresholds (Healy, 1985).

3. Data and Research Methodology

3.1 Measurement of Overconfidence

We follow Malmendier and Tate (2005) and construct our overconfidence measure based on executive option holdings.[11] Executives are classified as overconfident when they ever hold an option until maturity which is at least 40 percent in-the-money at the year-end prior to maturity.[12] Thus, overconfidence is considered as an inherent, time-invariant personal

[10] There is usually an asymmetric reaction concerning the reaching vs. not reaching of future goals such as the meeting of analyst targets or the reporting of positive earnings. Thus, there are strong negative consequences of not reaching these targets.

[11] We use ExecuComp to obtain information on executive stock option grants, exercised options, and option holdings. For details concerning the construction of the option portfolios and the overconfidence classification algorithm see the Appendix and Hall and Murphy (2002).

[12] The threshold is derived according to Hall and Murphy (2002) by using a constant relative risk-aversion parameter of 3 and 67 percent of wealth in company stock. The original Malmendier and Tate (2005)

characteristic of the executive.[13] Several other studies employ proxies for managerial overconfidence that are also related to the moneyness of the managers' stock options but do not require that a manager holds options until the last year of maturity. In particular, Schrand and Zechman (2012) classify managers as overconfident if the value of their exercisable options is higher than the industry median in a given year. We choose the measure used by Malmendier and Tate (2005) because it does not require to classify 50% of all managers as overconfident. Furthermore, it is more directly related to the individual executives as the classification is based on trading behavior of personal option portfolios.[14]

The rationale for relying on the executive's option exercise behavior as a means of classification into rational or overconfident managers is the following: Executives face a trade-off between exercising their options and retaining the options for later use. By retaining the options, they maintain the right to purchase company stock at potentially more favorable conditions in the future. The downside of this strategy is that it involves substantial costs for the executive in terms of exposure to idiosyncratic risk. Executive stock options typically have a maturity of 10 years and become vested after two to four years. This means that an executive cannot sell the options for several years. Furthermore, diversifying the exposure is problematic as executives are legally prohibited from short-selling their company's stock in the US. Given the large proportion of personal wealth tied to their company, diversification abilities across alternative investments are also limited. Lastly, besides the financial exposure, substantial human capital is also tied to the company (Malmendier and Tate, 2008). Consequently, executives can be considered as under-diversified investors who have large

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classification does not require a minimum threshold for in-the-moneyness and solely requires option holding until maturity.

[13] In their study of CEO overconfidence on acquisitions, Malmendier and Tate (2008) separate the overconfidence measure into two alternative measures to allow for time variation in the overconfidence classification. The first measure "Post-Longholder" is a dummy variable equal to one in all years after the CEO was classified for the first time as overconfident according to the above-described algorithm. The second measure "Pre-Longholder" is equal to one for the years before the CEO was first classified as overconfident. As shown in Section 5, our results hold with these alternative classifications.

[14] We test if our results hold if we use the measure proposed by Schrand and Zechman (2012) as a robustness check.

exposure to their company's risk. Thus, a rational executive should divest as soon as the option is sufficiently in-the-money because the cost of delayed exercise typically exceeds its option value. In contrast, an executive who is overconfident about the firm's future return would not exercise stock options in these situations.

3.2 Measurement of Big Bath Accounting

Following Elliott and Shaw (1988), all firm-years with special items (SPI, Compustat item #17) less than minus one percent of total assets are classified as big bath accounting years. Special items include any non-recurring items, impairment of goodwill, non-recurring inventory write downs, bad debt expense, restructuring expense, and provisions for doubtful accounts.[15] Although a non-discretionary element exists, it is likely to be clustered around time, not around CEO turnover. It might be that due to economic downturns or other exogenous shocks (e.g., natural disasters) special items occur predominantly in a specific year. This should not have an impact in our setting as CEO changes are distributed over a time span of 11 years for both groups (overconfident vs. rational) and both groups are approximately equally distributed over time.

Besides the main variable of interest we include the following control variables which could influence earnings management behavior. We use Compustat to collect data on firm characteristics for the five years before and after CEO turnover.

Firm Performance: Prior research suggests that weak firm performance is related to more aggressive earnings management. If current firm performance is poor, earnings are shifted from the future to the current period (e.g., DeFond and Park, 1997; Keating and Zimmerman, 1999). Furthermore, performance could be mechanically linked to the magnitude of special items since poor performance might trigger extraordinary write-offs. To control for

[15] In our sample about 75% of special items consists of asset write downs, goodwill impairment and restructuring costs (i.e., components where management has a particularly large valuation leeway).

firm performance we include return on assets (*ROA*), which is EBIT (Compustat item #178) divided by total assets (Compustat item #6) at the beginning of the year.

Firm Size: The size of the firm could also affect the earnings management behavior of managers. Skinner (1993), for example, shows that the size of the firm increases the likelihood of income-decreasing depreciation procedures. It might be that big bath accounting is related to the size of the company since more visible firms behave differently with respect to earnings manipulation. *Size* is measured as the natural logarithm of total assets in billion dollars.

Debt: The leverage ratio of a firm is related to debt covenant violations. Various papers show that earnings are manipulated before and after debt covenant violations (e.g., DeFond and Jiambalvo, 1994; Sweeney, 1994). Covenant violations are most often triggered by exceeding pre-set debt levels. Thus, we control for *Leverage* in all regressions and define *Leverage* as total debt (Compustat item #142) divided by total assets at the beginning of the year.

Market-to-Book Ratio: Missing of earnings benchmarks such as analyst forecasts can be particularly severe for high-growth firms (Skinner and Sloan, 2002), giving those firms an especially strong incentive for earnings manipulations. To control for growth opportunities, we include the market-to-book ratio (MTB) in our regressions. *MTB* is equal to the market value of a company's assets (Compustat item #199 times item #25 plus item #10 plus item #181) divided by the book value of a company's assets (Compustat item #6).

Corporate Governance: Weak internal control systems are often correlated with poor earnings quality (Doyle et al., 2006). In order to account for the impact of corporate governance mechanisms on earnings management, we include the "Entrenchment Index (*E-Index*)" proposed by Bebchuk et al. (2009). As a robustness check, we also use the Gompers et al. (2003) governance index (G-Index).

Managerial Compensation: Earnings-based compensation of CEOs provides several incentives to manipulate earnings. Holthausen et al. (1995) for instance show that managers engage in income-decreasing earnings management when bonus schemes are at their maximum. Bergstresser and Philippon (2006) point out that earnings manipulations are especially prevalent if compensation is closely tied to firm value. We collect information about CEO compensation (bonus and salary) from ExecuComp. *Bonus* is defined as the annual bonus payment divided by the sum of bonus and salary.

Routine vs. Non-Routine CEO Turnover: Pourciau (1993) and Wells (2002) show that big bath accounting is especially pronounced after non-routine turnover because in these cases negative outcomes can be attributed easily to the manager who has left the firm in discord. We hand-collect data on routine or non-routine turnover following Hazarika et al. (2012).[16]

3.3 Model Specification

3.3.1 Sample Selection

Since executive stock options typically have long maturities (on average 10 years), only a limited number of executives have the chance to show overconfidence. This means that the sample consists of executives who hold the CEO position for a long time period. Executives, who are only active for a few years, cannot be classified because there is no information in ExecuComp as to whether these executives hold an option package until maturity. In order to avoid a bias towards rational executives, we limit our sample to those executives who have the chance to reveal themselves as overconfident or not. Of 6,670 CEOs contained in the ExecuComp database only 1,931 meet all required criteria[17]; 1,391 (72.04

[16] A managerial turnover is classified as non-routine "if (i) the CEO was fired, forced out from the position, or departed due to policy differences; or (ii) the departing CEO's age is less than 60, and the announcement does not report that the CEO died, left because of poor health, or accepted another position elsewhere or within the firm; or (iii) the CEO 'retires' but leaves the job within six months of the 'retirement announcement' " (Hazarika et al. 2012, 47).

[17] ExecuComp contains information on 38,286 executives. Of these, 13 executives have no annual compensation data; 31,603 executives have not been CEO in any year; 2,268 executives do not appear in ExecuComp between

percent) are classified as rational and 540 (27.96 percent) are classified as overconfident. Furthermore, we delete financial institutions from the sample because of their special asset and thus impairment structure.

We limit our sample to CEOs who stayed in post for at least five full years after the CEO turnover. Thereby, we ensure that the respective CEO can benefit from potential big bath accounting. Furthermore, we require our sample to have sufficient data prior to the turnover to control for abnormal earnings pattern before the new CEO steps in. Thus, we follow prior research and focus on an eleven-year window surrounding CEO turnover (Dechow and Sloan, 1991; Murphy and Zimmerman, 1993).

In total we consider 398 CEO changes. Of the 398 incoming CEOs, 272 (68.34 percent) are classified as rational and 126 (31.66 percent) are classified as overconfident.[18] We do not condition on the type of the predecessor for two reasons. First, our overconfidence identification method allows us to classify only a limited number of these CEOs.[19] Second and more importantly, knowledge of the behavioral type of the predecessor does not affect our empirical predictions and would, if anything, only make our empirical results stronger. Consider first the case where the predecessor is rational. If the successor is also rational, our hypothesis predicts that the successor will take a big bath. If the successor is overconfident, we argue that the successor is less likely to take a big bath. Alternatively, consider the case where the predecessor is overconfident. If the successor is rational, we would again expect to see a big bath, presumably even at a larger scale as the predecessor might have inflated asset values due to his upwardly biased beliefs. If the incoming CEOs are also overconfident, we again expect no or at least less big bath behavior than if the incoming CEOs are rational.

2002 and 2010; 251 executives are dropped due to missing years; 192 executives have no option data; 135 executives had no CRSP stock price data; 1,893 have no chance to reveal themselves as overconfident or rational due to unavailability of data until option maturity.

[18] Over time, the portion of CEOs classified as overconfident and those classified as rational is relatively stable.

[19] However, looking at the former CEOs for which we know the type, we find that 80 percent of them are rational and 20 percent overconfident. This is broadly in line with the proportions of our overall classification.

Thus, in both cases we expect overconfident incoming CEOs to be less likely to take a big bath than rational incoming CEOs.

Overall we have 4,378 firm-year observations (398 CEO turnovers * 11 years). Table 1 shows the descriptive statistics of our sample. −1.2 percent of total assets are on average written off in form of special items *(SPI)*. 26 percent of all firms have more than one percent depreciation in the form of special items *(Big Bath)*. The average return on assets *(ROA)* is 10.8 percent, companies have average total assets *(TA)* of about 5.3 billion dollars and the average leverage ratio *(Leverage)* is 19.5 percent. The ratio of cash bonus to total cash salary *(Bonus)* has a mean of 39.2 percent. The average market-to-book ratio *(MTB)* is approximately two.

Table 1. Descriptive Statistics

Variable	N	Mean	Std	Min	P25	P50	P75	Max
SPI	4,378	−0.012	0.039	−0.225	−0.011	0.000	0.000	0.081
Big Bath	4,378	0.261	0.439	0.000	0.000	0.000	1.000	1.000
ROA	4,378	0.108	0.094	−0.258	0.061	0.104	0.156	0.406
TA	4,378	5.306	11.334	0.036	0.491	1.435	4.381	81.499
Size	4,378	0.428	1.587	−3.333	−0.712	0.361	1.477	4.401
Leverage	4,378	0.195	0.155	0.000	0.068	0.183	0.285	0.794
E−Index	4,378	2.475	1.123	0.000	2.000	3.000	3.000	6.000
Bonus	4,378	0.392	0.181	0.000	0.389	0.421	0.448	0.755
MTB	4,378	2.043	1.317	0.760	1.253	1.609	2.300	8.385

This table provides descriptive statistics for the 11 years around CEO turnover. The sample includes all firms in the ExecuComp database as of December 2010 with CEO turnover, for which the incoming CEO could be classified as overconfident or rational and stayed in the company for at least five years. *SPI* is special items (unusual or nonrecurring) in $millions. *Big Bath* is a dummy variable which equals one if special items divided by total assets are less than minus one percent. *ROA* is return on assets (ROA) measured as EBIT divided by total assets. *TA* is total assets in $billion. *Size* is total assets in log $billion. *Leverage* is total debt divided by total assets. *E-Index* is the Bebchuk et al. (2009) entrenchment index. *Bonus* is a manager's annual bonus payment divided by the sum of bonus and salary. *MTB* is market value of equity plus book value of debt divided by total assets.

Pearson and Spearman correlations are shown in Table 2. The CEO overconfidence proxy is not included in the correlation table as it is only available for the time period of the incoming CEO, while the other variables are given for the entire −5/+5 year period surrounding the CEO turnover. Special items (*SPI*) are positively correlated with *ROA* and *Bonus* while *Big Bath* is negatively correlated with these two variables.

Table 2. Pearson and Spearman Correlations

Variable	SPI	Big Bath	ROA	Size	Leverage	E-Index	Bonus	MTB
SPI		−0.636***	0.156***	0.071***	0.003	0.004	0.081***	−0.042***
Big Bath	−0.787***		−0.127***	0.005	0.034**	−0.007	−0.096***	0.009
ROA	0.117***	−0.138***		0.089***	−0.127***	−0.065***	0.195***	0.409***
Size	0.000	0.003	0.023		0.196***	−0.003	0.140***	−0.104***
Leverage	−0.023	0.016	−0.195***	0.283***		0.041***	−0.022	−0.249***
E-Index	−0.001	−0.017	−0.045***	0.042***	0.069***		−0.051***	−0.107***
Bonus	0.073***	−0.086***	0.212***	0.181***	−0.008	−0.018		0.146***
MTB	0.017	−0.019	0.6128***	−0.062***	−0.371***	−0.105***	0.186***	

This table provides Spearman correlations below the diagonal and Pearson correlations above the diagonal. *SPI* is special items (unusual or nonrecurring) in $millions. *Big Bath* is a dummy variable which equals one if special items divided by total assets are less than minus one percent. *ROA* is return on assets (ROA) measured as EBIT divided by total assets. *Size* is total assets in log $billion. *Leverage* is total debt divided by total assets. *E-Index* is the Bebchuk et al. (2009) entrenchment index. *Bonus* is a manager's annual bonus payment divided by the sum of bonus and salary. *MTB* is market value of equity plus book value of debt divided by total assets. ***,**,* indicate significance at the 1 percent, 5 percent, and 10 percent level, respectively.

3.3.2 Big Bath Accounting Model

The hypothesis is tested by estimating a logit model with big bath accounting as the dependent variable. Big bath accounting is a dummy variable which is equal to one if special items are less than minus one percent of total assets. *Overconfident* is equal to one if the hired CEO is classified as overconfident and equal to zero if the hired CEO is classified as rational.

$$Prob\left(SPI < -0.01\right) = logit\left(\beta_0 + \beta_1 * Overconfident + \gamma * controls'\right) \quad (1)$$

4. Results

4.1 Univariate Results

Table 3 presents univariate results for our hypothesis. Firms with overconfident CEOs are significantly less likely to use big bath accounting in the year of the turnover. While big bath accounting is used in 41.5 percent of the turnovers with rational incoming CEOs, only 25.4 percent of the overconfident CEOs use big bath accounting. This is in line with our hypothesis (i.e., for overconfident managers the expected costs of big bath accounting seem to

outweigh their perceived benefits). The univariate results show a significant difference in big bath accounting between overconfident and rational CEOs. [20]

Furthermore, in Table 3 we analyze how firms managed by overconfident CEOs differ from firms with rational CEOs in the year of the turnover. We find that firms managed by overconfident CEOs are smaller, have lower leverage ratios and better corporate governance than firms with rational CEOs. In our multivariate analysis below we include these company and manager characteristics in order to account for the heterogeneity of firms managed by rational and overconfident CEOs.

Table 3. Univariate Results

Variable	N	Overconfident=0	Overconfident=1	p-Value
SPI	398	−0.023	−0.014	0.06
Big Bath	398	0.415	0.254	0.00
ROA	398	0.086	0.119	0.00
TA	398	5.618	4.302	0.27
Size	398	0.480	0.335	0.39
Leverage	398	0.217	0.188	0.09
E-Index	398	2.375	2.504	0.28
Bonus	398	0.359	0.354	0.81
MTB	398	1.943	2.074	0.37

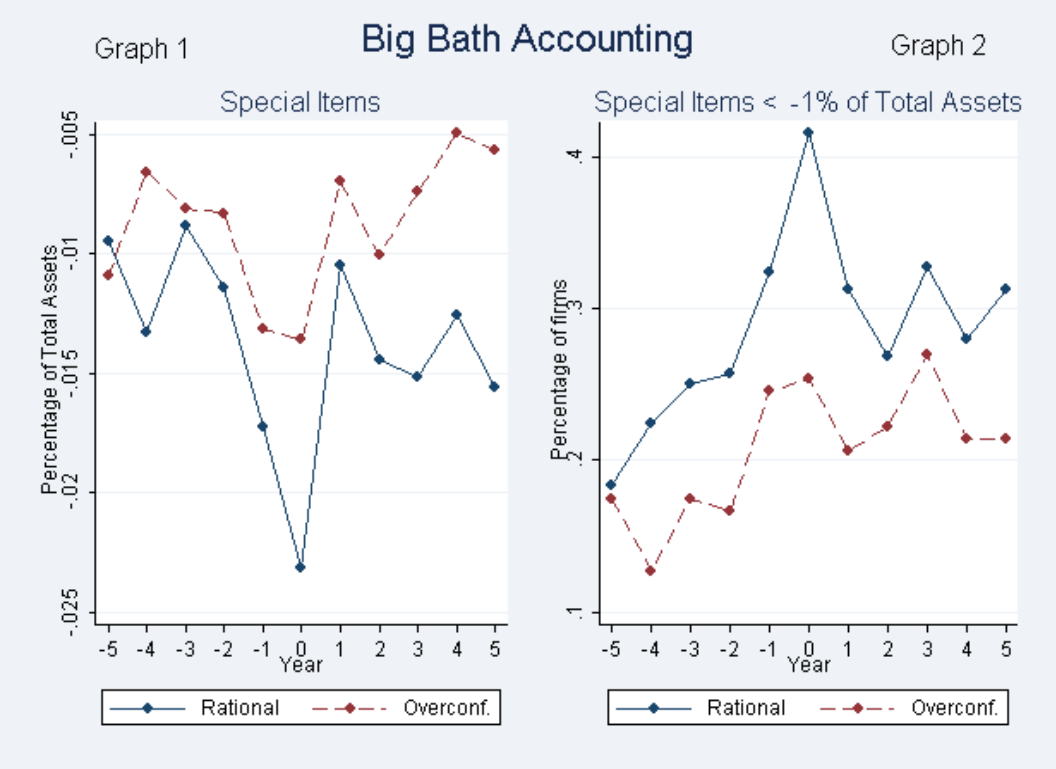
This table provides mean values of accounting and firm characteristics in the year of CEO turnover. The sample is divided into firms where the hired CEO is rational *(Overconfident=0)* or overconfident *(Overconfident=1)*. *Overconfident* is a dummy variable which equals one if a manager holds executive stock options until the last year of maturity that are at least 40% in-the-money and zero otherwise. *SPI* is special items (unusual or nonrecurring) in $millions. *Big Bath* is a dummy variable which equals one if special items divided by total assets are less than minus one percent. *ROA* is return on assets (ROA) measured as EBIT divided by total assets. *Size* is total assets in log $billion. *Leverage* is total debt divided by total assets. *E-Index* is the Bebchuk et al. (2009) entrenchment index. *Bonus* is a manager's annual bonus payment divided by the sum of bonus and salary. *MTB* is market value of equity plus book value of debt divided by total assets.

Figure 1 graphically illustrates the univariate results presented in Table 3. Graph 1 shows the average ratio of write-offs in special items to total assets separately for firms with overconfident and rational CEOs. Firms with overconfident CEOs have fewer write-offs in the year of the turnover compared to those with rational CEOs. By classifying negative special items of more than minus one percent of total assets as big bath accounting, Graph 2 reveals that 16 percent more firms engage in big bath accounting when the incoming CEO is

[20] Big bath accounting occurred mainly in the last quarter of the respective fiscal year, supporting the argument that they were under the control of the incoming CEO.

rational than when the incoming CEO is overconfident. Overall, the evidence in Figure 1 is consistent with our hypothesis that firms that hire overconfident CEOs are less likely to engage in big bath accounting.[21]

Figure 1. Big Bath Accounting



This figure presents percentages of firms that engage in big bath accounting during the 11-year window around CEO turnover for rational vs. overconfident incoming managers. In Graph 1, we show the level of special items over total assets. Graph 2 shows the percentage of firms with special items over total assets less than minus one percent for incoming overconfident CEOs and incoming rational CEOs.

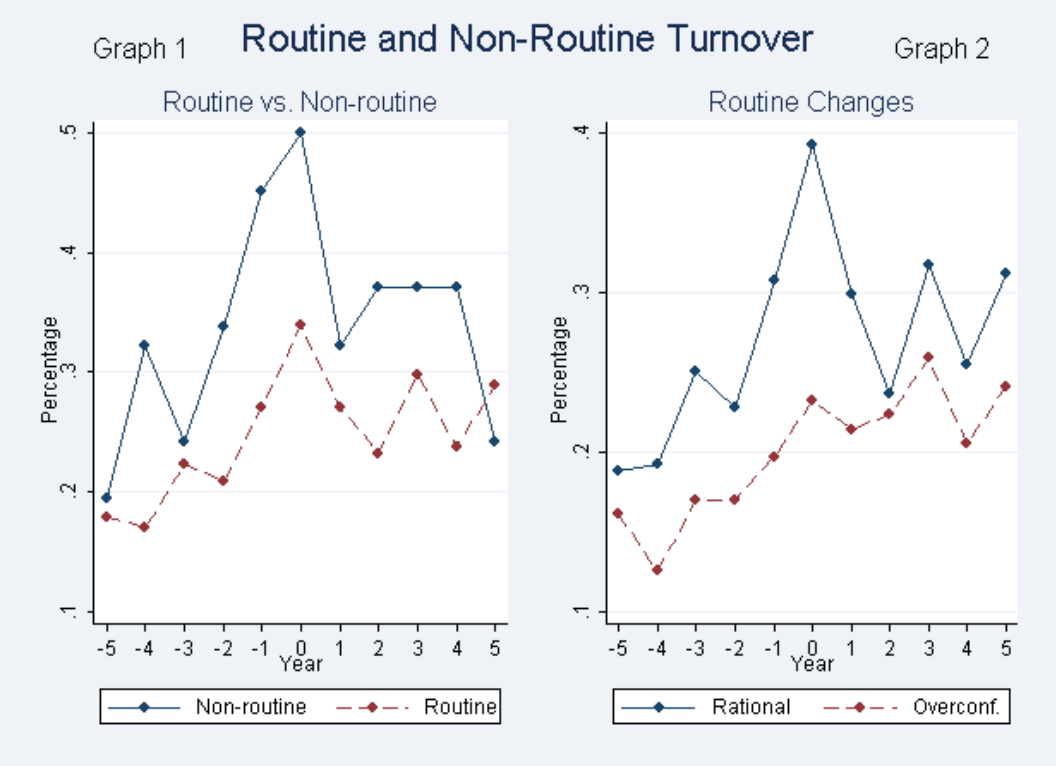
4.2 Routine vs. Non-Routine Turnover

Whether a CEO change is routine or non-routine seems to be an important determinant in the decision to engage in big bath accounting (Pourciau, 1993; Wells, 2002). In order to rule out that our findings are a result of rational CEOs being mainly the successor in non-routine turnover and overconfident CEOs being mainly the successor in routine turnover, we separately investigate big bath accounting for routine and non-routine changes. Graph 1 of Figure 2 distinguishes between routine and non-routine management changes. Consistent with

[21] We already observe an increase in special items in the year preceding the turnover. This finding is consistent with Pourciau (1993).

Pourciau (1993) and Wells (2002) we find that big bath accounting is more frequent after non-routine turnover (first graph). In the second graph we plot the proportion of firms engaging in big bath accounting for incoming overconfident and rational CEOs only after routine CEO turnover. Although we are only looking at routine changes, we still observe the same pattern as in Graph 1 and 2, suggesting that the difference between overconfident and rational CEOs is not driven by whether a management change is routine or non-routine.[22] Overall, Figure 2 indicates that the difference between overconfident and rational CEOs is not driven by whether a management change is routine or non-routine.

Figure 2. Routine and Non-Routine Turnover



This figure presents percentages of firms that engage in big bath accounting during the 11-year window around CEO turnover for non-routine vs. routine turnover (Graph 1) and for rational vs. overconfident incoming managers in routine turnover (Graph 2). Big bath accounting is defined as a dummy variable that equals one if special items over total assets are less than minus one percent.

[22] We do not show the corresponding graph with only non-routine changes because of data constraints. Only 12 CEO changes are non-routine where the incoming CEO is classified as overconfident.

4.3 Justified vs. Unjustified Big Bath Accounting

The large write-offs that we classify as big bath accounting might be justified by poor firm performance preceding the CEO turnover. To mitigate concerns that our results are driven by differences in inherent big bath accounting potential, we compare the firm performance (i.e., return on assets (*ROA*) and stock market performance) before the turnover year for firms that hire overconfident CEOs with those that hire rational CEOs. Furthermore, the use of large write-offs in prior years could limit the big bath accounting potential in the turnover year. Therefore, we additionally compare the use of large write-offs prior to the turnover year for both types of firms. In unreported results, we find that firms that hire a rational CEO perform similarly prior to the turnover year compared to firms that hire an overconfident CEO. Furthermore, there is no significant difference in the use of large write-offs prior to the turnover. Consequently, both types of firms possess a similar big bath accounting potential in the year of the turnover.

Next, we investigate whether incoming overconfident CEOs fail to execute a justified big bath in the turnover year. If poor firm performance asks for large write-offs and the incoming CEO fails to undertake them, then the necessary restructuring is only postponed and should ultimately materialize in subsequent years. Thus, we should observe a significantly larger fraction of firms taking a big bath in future years given that justified write-offs are delayed in the turnover year. In unreported results we find that firms managed by overconfident CEOs are not significantly more likely to take a big bath in the years following the turnover than firms managed by rational CEOs. If anything, they are less likely to do so. This finding is also supported graphically by Figure 1.

In summary, our results are unlikely to be driven by either selection of rational CEOs into firms with more potential for justified large write-offs or by a failure of overconfident

CEOs to exercise justified large write-offs in the turnover year. We further elaborate this point in a multivariate setting in the subsection "*Potential of Big Bath Accounting*".

4.4 Multivariate Results

In our regressions we control for non-routine turnover events with an indicator variable that is equal to one if the turnover was non-routine (or forced) and zero otherwise. In addition, we control for *ROA*, *size*, *leverage*, *MTB*, corporate governance mechanisms (*E-Index*), and the bonus compensation of the CEO (*Bonus*). The models include industry and time fixed effects when indicated. Standard errors are clustered at the firm level.

To test the hypothesis that firms with overconfident CEOs engage less often in big bath accounting, we estimate logit regressions with a dummy variable as the dependent variable that is equal to one if a firm has less than minus one percent of total assets written off in form of special items. The marginal effects in Table 4 represent the change in the probability of engaging in big bath accounting for a one-unit change in the respective control variable evaluated at the mean of all other control variables. We find support for the hypothesis that overconfident CEOs engage less in big bath accounting than rational CEOs. In all of our specifications, overconfidence of the new CEO is negatively related to big bath accounting. On average it is about 15 percent less likely that an overconfident CEO will take a big bath, statistically significant at the one percent level. The effects of the control variables are in line with the findings of prior literature on big bath accounting. In particular, big bath accounting is more likely to occur when the turnover was non-routine. After a CEO has been fired or forced out, the new CEO will engage more often in large write-offs that can be attributed to his predecessor.

Table 4. Big Bath Regressions

Dependent Variable	Model 1 Big Bath	Model 2 Big Bath	Model 3 Big Bath
Overconfident	−0.161***	−0.154***	−0.149***
	(0.049)	(0.050)	(0.054)
Non-routine		0.146**	0.114
		(0.069)	(0.084)
ROA			−0.681*
			(0.379)
Size			0.056***
			(0.019)
Leverage			0.256
			(0.185)
E-index			−0.009
			(0.023)
Bonus			−0.643***
			(0.149)
MTB			0.042*
			(0.024)
Observations	398	398	393
Pseudo R^2	0.019	0.028	0.196
Year Fixed Effects	No	No	Yes
Industry Fixed Effects	No	No	Yes

This table provides marginal effects for logit regressions using big bath accounting as the dependent variable. *Big Bath* is defined as a dummy variable that equals one if special items over total assets are less than minus one percent in the turnover year. The main variable of interest is *Overconfident*, which is an indicator variable that equals one if the CEO is classified as overconfident and zero otherwise. *ROA* is return on assets (ROA) measured as EBIT divided by total assets. *Size* is total assets in log $billion. *Leverage* is total debt divided by total assets. *E-Index* is the Bebchuk et al. (2009) entrenchment index. *Bonus* is a manager's annual bonus payment divided by the sum of bonus and salary. *MTB* is market value of equity plus book value of debt divided by total assets. The regressions include industry and year dummies when indicated. Standard errors are heteroskedasticity robust and clustered at the firm level to account for non-independent observations within firms. ***,**,* indicate significance at the 1 percent, 5 percent, and 10 percent level, respectively.

Results so far indicate a strong difference in the use of special items between firms hiring overconfident CEOs and those hiring rational CEOs in the turnover year. However, Figure 1 also indicates a somewhat more pronounced use of special items by firms hiring rational CEOs in the remaining years. For this reason we next investigate whether there is generally a significant difference in big bath accounting between both types of firms or whether the turnover year is indeed crucial. Table 5 reports the 11 years surrounding the CEO turnover. Consistent with the existing literature we find that firms are more likely to take a big bath in the year of the turnover (*Year 0*). After controlling for relevant firm, year, and industry fixed effects, there is generally no significant big bath accounting behavior in other years. The interaction terms of *Overconfident* with the respective years confirm that incoming

overconfident CEOs have a significantly lower big bath accounting likelihood in the turnover year compared to rational CEOs (*Year 0* x *Overconfident*). The effect also spills over to the subsequent year to some extent (*Year 1* x *Overconfident*). In all but one of the remaining years, the difference in big bath accounting behavior between firms with rational vs. overconfident incoming CEOs is statistically insignificant.

4.5 Addressing Endogeneity

4.5.1 CEO Selection

There might be firm characteristics which could influence the firm's decisions to hire an overconfident CEO and simultaneously explain the predicted big bath accounting pattern. For example, it might be that past performance influences the decision to hire an overconfident manager and leads to abnormal levels of special items. Furthermore, in a theoretical model, de la Rosa (2011) shows that if incoming CEOs are overconfident they will accept a contract with a higher performance payment and a lower base payment than rational candidates.

We control for potential endogeneity by using a propensity score matching. In the first stage, we estimate a logit regression with a dummy as the dependent variable that is equal to one (zero) if the new manager is overconfident (rational). This gives us the conditional propensity of treatment (an overconfident manager) given certain observable covariates.

Table 5. Big Bath Regressions – All Years

Dependent Variable	Model 1 Big Bath	Model 2 Big Bath	Model 3 Big Bath
Year −4	0.050	0.048	0.035
	(0.044)	(0.044)	(0.044)
Year −3	0.080**	0.073*	0.046
	(0.040)	(0.040)	(0.040)
Year −2	0.089**	0.078*	0.013
	(0.044)	(0.043)	(0.040)
Year −1	0.162***	0.143***	0.062
	(0.047)	(0.046)	(0.046)
Year 0	0.258***	0.198***	0.101*
	(0.049)	(0.050)	(0.052)
Year 1	0.150***	0.122***	0.009
	(0.046)	(0.045)	(0.044)
Year 2	0.101**	0.078*	−0.027
	(0.048)	(0.047)	(0.044)
Year 3	0.166***	0.137***	0.025
	(0.047)	(0.047)	(0.049)
Year 4	0.114**	0.082*	−0.014
	(0.046)	(0.045)	(0.047)
Year 5	0.150***	0.110**	−0.013
	(0.048)	(0.047)	(0.050)
Year −5 x Overconfident	−0.012	−0.001	0.007
	(0.052)	(0.053)	(0.053)
Year −4 x Overconfident	−0.110***	−0.105***	−0.103***
	(0.039)	(0.039)	(0.037)
Year −3 x Overconfident	−0.077*	−0.068	−0.055
	(0.041)	(0.043)	(0.043)
Year −2 x Overconfident	−0.091**	−0.080*	−0.063
	(0.039)	(0.041)	(0.041)
Year −1 x Overconfident	−0.066*	−0.050	−0.049
	(0.038)	(0.040)	(0.039)
Year 0 x Overconfident	−0.116***	−0.101***	−0.092***
	(0.030)	(0.031)	(0.030)
Year 1 x Overconfident	−0.092**	−0.084**	−0.074**
	(0.036)	(0.037)	(0.037)
Year 2 x Overconfident	−0.045	−0.038	−0.042
	(0.043)	(0.043)	(0.041)
Year 3 x Overconfident	−0.049	−0.039	−0.039
	(0.040)	(0.041)	(0.040)
Year 4 x Overconfident	−0.061	−0.048	−0.054
	(0.041)	(0.042)	(0.041)
Year 5 x Overconfident	−0.086**	−0.071*	−0.060
	(0.036)	(0.039)	(0.038)
Observations	4,378	4,378	4,378
Pseudo R^2	0.019	0.039	0.084
Control Variables	No	Yes	Yes
Year Fixed Effects	No	No	Yes
Industry Fixed Effects	No	No	Yes

This table provides marginal effects for logit regressions using big bath accounting as the dependent variable. *Big Bath* is defined as a dummy variable that equals one if special items over total assets are less than minus one percent in the turnover year. The main variable of interest is *Overconfident*, which is an indicator variable that equals one if the CEO is classified as overconfident and zero otherwise. The regressions include industry and year dummies as well as all control variables used in Table 4 when indicated. Standard errors are heteroskedasticity robust and clustered at the firm level to account for non-independent observations within firms. ***,**,* indicate significance at the 1 percent, 5 percent, and 10 percent level, respectively.

We control for CEO characteristics (age, delta, and vega, see below) and firm characteristics (*firm age* and three year averages of *ROA*, *special items*, *leverage*, and *size* prior to the CEO turnover) and additionally for *overconfidence* of the outgoing CEO.[23] Following Core and Guay (2002), we define *Delta* as the sensitivity of the CEO's stock and option portfolios with respect to changes in the value of the company's stock price and *Vega* as the sensitivity of the CEO's stock and option portfolio with respect to a change in the company's stock return volatility. Additionally, we include a dummy variable that is equal to one if the turnover was non-routine.[24] The unreported regression results suggest that firm size and the magnitude of incentive-based compensation have an impact on the decision to hire an overconfident CEO. Smaller firms and firms with stronger incentive-based compensation are more likely to hire overconfident CEOs.[25] The magnitude of special items prior to the turnover is not related to the decision to hire an overconfident manager. The behavioral type of the outgoing CEO does also not explain the type of the incoming CEO. This suggests that firms that hire overconfident CEOs do not generally favor this type of manager or that overconfident CEOs select themselves into a special type of firms. To this extent, our PSM procedure also rules out that time-invariant unobservable firm characteristics drive the choice to hire a CEO of a certain behavioral type.[26]

In the second step, we match two firms which have the same propensity of hiring an overconfident CEO based on the logit regression of the first stage but where in fact one of the firms hired an overconfident CEO (treatment) and the other firm hired a rational CEO

[23] With our overconfidence classification based on Malmendier and Tate (2005) we are able to identify only a limited number of outgoing managers. Therefore, overconfidence is measured analogue to Schrand and Zechman 2012 because every manager can be classified as either overconfident or rational. Managers are identified as overconfident if the dollar value of their exercisable options exceed the industry median based on two-digit SIC codes.

[24] The number of observations drops from 398 to 253 due to missing values for some variables.

[25] As a robustness test we also control for delta and vega in our baseline regression (i.e., whether firms hiring overconfident CEOs are less likely to engage in big bath accounting). The results remain unchanged when controlling for delta and vega. However, doing this reduces our sample size significantly due to missing information for some executives. Therefore, we do not include delta and vega in our main analysis.

[26] We acknowledge that there might also be time-variant unobservable factors that influence the choice to hire an overconfident CEO. However, conditioning on them is naturally impossible.

(control). We use the nearest neighbor matching method which matches two pairs with the lowest propensity score differences. We use a caliper of five percentage points which means that we do not match a treatment firm with a control firm if the difference in the propensity scores is larger than five percentage points. On the one hand, this restriction ensures that the matched pairs are similar across the observable variables. On the other hand, this reduces the number of matched pairs. The results of the propensity score matched model in Table 6 confirm our previous results. Across all models overconfident managers are less likely to engage in big bath accounting. Firms with an overconfident incoming CEO are up to 20 percent less likely to engage in big bath accounting than firms with a rational incoming CEO.

Table 6. Big Bath Regressions – Matched on CEO Type

Dependent Variable	**Model 1** **PSM** **Big Bath**	**Model 2** **PSM** **Big Bath**	**Model 3** **PSM** **Big Bath**
Overconfident	−0.157**	−0.161**	−0.202**
	(0.072)	(0.074)	(0.100)
Non-routine		0.327***	0.398**
		(0.108)	(0.171)
ROA			−0.776
			(0.524)
Size			0.059
			(0.037)
Leverage			0.435
			(0.317)
E-index			0.040
			(0.046)
Bonus			−0.784***
			(0.260)
MTB			0.071**
			(0.033)
Observations	166	166	153
Pseudo R^2	0.022	0.063	0.296
Year Fixed Effects	No	No	Yes
Industry Fixed Effects	No	No	Yes

This table provides marginal effects for logit regressions using big bath accounting as the dependent variable of a propensity score matched model (PSM). *Big Bath* is defined as a dummy variable that equals one if special items over total assets are less than minus one percent in the turnover year. The main variable of interest is *Overconfident*, which is an indicator variable that equals one if the CEO is classified as overconfident and zero otherwise. *ROA* is return on assets (ROA) measured as EBIT divided by total assets. *Size* is total assets in log $billion. *Leverage* is total debt divided by total assets. *E-Index* is the Bebchuk et al. (2009) entrenchment index. *Bonus* is a manager's annual bonus payment divided by the sum of bonus and salary. *MTB* is market value of equity plus book value of debt divided by total assets. The regressions include industry and year dummies when indicated. Standard errors are heteroskedasticity robust and clustered at the firm level to account for non-independent observations within firms. ***,**,* indicate significance at the 1 percent, 5 percent, and 10 percent level, respectively.

4.5.2 Potential of Big Bath Accounting

Another form of self-selection, which might affect our results, is the potential of big bath accounting. It might be that for some reasons overconfident (rational) managers self-select into firms with lower (higher) inherent big bath potential. To rule out that there are differences with respect to the possibility to engage in an earnings bath, we perform an additional propensity score matching. In the first stage we model the likelihood to take an earnings bath based on past and current performance as well as past special items. The rationale for this is that poor current and recent firm performance might yield more potential for big bath accounting (e.g., impairments) than if the company was performing well. To rule out that special items occurred in the former years we include special items as controls. Furthermore, it might be that big bath accounting is related to the size of the company since more visible firms behave differently with respect to earnings manipulation. We estimate the following model within all firm years of the Compustat Database.

$$\begin{aligned} Prob\left(SPI_t < -0.01\right) = logit\Big(&\beta_0 + \beta_1 * ROA_t + \beta_2 * ROA_{t-1} \\ &+ \beta_3 * ROA_{t-2} + \beta_4 * ROA_{t-3} + \beta_5 * SPI_{t-1} \\ &+ \beta_6 * SPI_{t-2} + \beta_7 * SPI_{t-3} + \beta_8 * Size_{t-1}\Big) \end{aligned} \tag{2}$$

In untabulated results the first stage reveals that the current ROA is significantly negatively related and size is significantly positive related to big bath accounting. Based on the first stage we generate matched pairs of firms with rational CEOs and firms with overconfident CEOs, which have the same propensity to engage in big bath accounting. We match each pair with the nearest neighbor without replacement and we use a caliper of five percentage points. The results in Table 7 show that our results are not affected by the matching design. Thus, our results are not driven by overconfident managers self-selecting into companies with lower inherent big bath potential.

Table 7. Big Bath Regressions – Matched on Big Bath Potential

Dependent Variable	Model 1 PSM Big Bath	Model 2 PSM Big Bath	Model 3 PSM Big Bath
Overconfident	−0.184***	−0.179***	−0.205***
	(0.062)	(0.062)	(0.079)
Non-routine		0.184*	0.200*
		(0.099)	(0.120)
ROA			−1.436**
			(0.544)
Size			0.093***
			(0.030)
Leverage			0.627***
			(0.215)
E-index			−0.011
			(0.035)
Bonus			−0.649***
			(0.227)
MTB			0.092***
			(0.033)
Observations	228	228	208
Pseudo R^2	0.029	0.042	0.238
Year Fixed Effects	No	No	Yes
Industry Fixed Effects	No	No	Yes

This table provides marginal effects for logit regressions using big bath accounting as the dependent variable. *Big Bath* is defined as a dummy variable that equals one if special items over total assets are less than the specified threshold in each model in the turnover year. The main variable of interest is *Overconfident*, which is an indicator variable that equals one if the CEO is classified as overconfident and zero otherwise. *ROA* is return on assets (ROA) measured as EBIT divided by total assets. *Size* is total assets in log $billion. *Leverage* is total debt divided by total assets. *E-Index* is the Bebchuk et al. (2009) entrenchment index. *Bonus* is a manager's annual bonus payment divided by the sum of bonus and salary. *MTB* is market value of equity plus book value of debt divided by total assets. The regressions include industry and year dummies. Standard errors are heteroskedasticity robust and clustered at the firm level to account for non-independent observations within firms. ***,**,* indicate significance at the 1 percent, 5 percent, and 10 percent level, respectively.

5. Robustness Tests

5.1 Alternative Measures of Overconfidence

In this section, we investigate the sensitivity of our results to the chosen overconfidence classification parameters. Table 8 repeats our analyses of big bath accounting using alternative overconfidence classifications.

We consider four alternatives to identify CEOs as overconfident or rational. Alternatives 1 and 2 follow our original procedure and classify CEOs as overconfident if they ever hold an option until the final maturity year, which is sufficiently deep in the money. Alternative 1 (2) thereby considers a moneyness of 20 percent (60 percent) as sufficient.

In alternative 3 we follow Sen and Tumarkin (2009) and classify CEOs as overconfident based on their holdings of company stock. This method follows the same rationale as the option based classification method. As executives typically have strong exposure to idiosyncratic risk, they should hold as little of their company's stock as possible. However, according to Core and Larcker (2002), firms often require that their top executives hold a minimum of company stock. This requirement is often stated in terms of multiples of the executive's salary. If the executive holds more company stock than required by company constitutions, the executive is considered to be overconfident with respect to the future performance of the firm. Following Sen and Tumarkin (2009), we classify CEOs as overconfident when their holdings of company stock exceed the median of the ratio of stock holdings-to-salary.

In alternative 4, we investigate whether CEO overconfidence can be treated as a time-invariant personal characteristic of the CEO. In particular, we consider only observations on big bath accounting reported before the year in which the respective CEO was first classified as overconfident. If CEO overconfidence only manifests after this point in time, there should be no effect in prior periods.

Alternative 5 uses the classification based on Schrand and Zechman (2012). CEOs are classified as overconfident or rational based on the moneyness of their exercisable options. In particular, managers are identified as overconfident if the dollar value (measured as the difference between the current stock price and the average exercise price of the options times the number of options held) of their exercisable options exceeds the industry median based on two-digit SIC codes.[27]

[27] We further normalize the dollar value of exercisable options by total sales to avoid that mostly CEOs in large companies are classified as overconfident because large companies usually grant more options to their managers.

Overall, our results are robust to alternative measures of overconfidence. Firms with CEOs classified as overconfident are significantly less likely to engage in big bath accounting in the turnover year in all settings, independent of the classification method used.

Table 8. Big Bath Regressions – Alternative Overconfidence Classifications

Dependent Variable	Model 1 Big Bath	Model 2 Big Bath	Model 3 Big Bath	Model 4 Big Bath	Model 5 Big Bath
Overconfident (20)	−0.114** (0.056)				
Overconfident (60)		−0.126** (0.058)			
Voluntary Holder			−0.155*** (0.057)		
Pre-Longholder				−0.145*** (0.056)	
Overconfident (SZ)					−0.098* (0.054)
Observations	393	393	393	393	393
Pseudo R^2	0.190	0.191	0.194	0.194	0.189
Control Variables	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes

This table provides marginal effects for logit regressions using big bath accounting as the dependent variable. *Big Bath* is defined as a dummy variable that equals one if special items over total assets are less than minus one percent in the turnover year. In Model 1, CEOs are classified as overconfident if they ever held an option until the final maturity year, which is at least 20 percent in the money. Model 2 uses the same classification method with a moneyness threshold of 60 percent. Model 3 classifies CEOs as overconfident if they held more company stock than required by company constitutions. Model 4 considers only big bath accounting that occurred before the year in which the CEOs were classified as overconfident (i.e., before they held an option until the final maturity year for the first time, which is at least 40 percent in the money). In Model 5, CEOs are identified as overconfident if the moneyness of their exercisable options exceeds the industry median based on 2-digit SIC codes following Schrand and Zechman (2012). The regressions furthermore include all control variables used in Table 4. The regressions include industry and year dummies. Standard errors are heteroskedasticity robust and clustered at the firm level to account for non-independent observations within firms. ***,**,* indicate significance at the 1 percent, 5 percent, and 10 percent level, respectively.

5.2 Alternative Big Bath Thresholds

This section tests the robustness of our results related to our hypothesis with respect to the measurement of big bath accounting. Table 9 replicates the regressions of Table 4 with different classification thresholds for big bath accounting. In particular, model (1) defines big bath accounting as negative special items, model (2) as special items over total assets less than minus 0.5 percent, model (3) as less than minus one percent, model (4) as less than minus 1.5 percent, and model (5) as less than minus two percent. The results suggest that our findings are not sensitive to the measurement of big bath accounting. Firms hiring an

overconfident CEO rather than a rational CEO are less likely to engage in big bath accounting. The effect is statistically significant in all but the most stringent threshold (model 5). However, the lack of significance for this specification is likely to be due to the small number of observations classified as big bath.

Table 9. Big Bath Regressions – Alternative Big Bath Thresholds

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
	< 0.000	**< 0.005**	**< 0.010**	**< 0.015**	**< 0.020**
Dependent Variable	**Big Bath**	**Big Bath**	**Big Bath**	**Big Bath**	**Big Bath**
Overconfident	−0.186***	−0.159***	−0.149***	−0.151***	−0.071
	(0.060)	(0.058)	(0.054)	(0.048)	(0.046)
Non-routine	0.162**	0.091	0.114	0.038	0.024
	(0.077)	(0.086)	(0.084)	(0.072)	(0.060)
ROA	−0.262	−0.598	−0.681*	−0.684**	−0.723**
	(0.415)	(0.409)	(0.379)	(0.332)	(0.302)
Size	0.079***	0.063***	0.056***	0.045**	0.029*
	(0.021)	(0.021)	(0.019)	(0.018)	(0.016)
Leverage	0.338*	0.325	0.256	0.218	0.078
	(0.200)	(0.203)	(0.185)	(0.165)	(0.144)
E-Index	0.009	0.007	−0.009	−0.016	−0.015
	(0.026)	(0.025)	(0.023)	(0.021)	(0.019)
Bonus	−0.631***	−0.643***	−0.643***	−0.568***	−0.454***
	(0.154)	(0.156)	(0.149)	(0.135)	(0.116)
MTB	0.127	0.042	0.042*	0.025	0.032
	(0.027)	(0.026)	(0.024)	(0.022)	(0.021)
Observations	393	393	393	393	393
Pseudo R^2	0.172	0.184	0.196	0.183	0.155
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes

This table provides marginal effects for logit regressions using big bath accounting as the dependent variable. *Big Bath* is defined as a dummy variable that equals one if special items over total assets are less than the specified threshold in each model in the turnover year. The main variable of interest is *Overconfident*, which is an indicator variable that equals one if the CEO is classified as overconfident and zero otherwise. *ROA* is return on assets (ROA) measured as EBIT divided by total assets. *Size* is total assets in log $billion. *Leverage* is total debt divided by total assets. *E-Index* is the Bebchuk et al. (2009) entrenchment index. *Bonus* is a manager's annual bonus payment divided by the sum of bonus and salary. *MTB* is market value of equity plus book value of debt divided by total assets. The regressions include industry and year dummies. Standard errors are heteroskedasticity robust and clustered at the firm level to account for non-independent observations within firms. ***,**,* indicate significance at the 1 percent, 5 percent, and 10 percent level, respectively.

5.3 Impact of the CFO

Accounting policies are likely to be influenced not only by the CEO but also by the CFO of a company. For that reason, we additionally analyze our hypothesis in the setting of CFO turnover. We find no evidence that CFO overconfidence has the same influence on big

bath accounting in the year of appointment as that of the CEO.[28] This could be due to two reasons: First, it could be that it is the CEO who shapes the accounting policy of a firm and the CFO is of minor importance in this respect. Second, we consider it unlikely that a new CFO will engage in big bath accounting because large write-offs would portray the current CEO in a bad light.

6. Conclusion

There is a dark and a bright side of managerial overconfidence. So far the existing literature mostly focuses on the dark side and highlights circumstances in which overconfidence leads to excessive risk-taking or other harmful actions by the respective manager. In this paper, however, we argue that there is also a bright side of managerial overconfidence and this behavioral feature could be beneficial in certain situations. In particular, we investigate whether overconfident managers engage less in big bath accounting after their appointment. Incoming overconfident managers believe that their companies' projects will realize higher earnings in the future when managed by them. Consequently they feel less need to transfer current earnings to the future and are thus less likely to engage in big bath accounting. Rational managers, however, do not have this upwardly biased belief and are hence more susceptible to engage in a big bath earnings manipulation. As manipulating earnings is generally not in the interests of stakeholders, we consider overconfidence as a beneficial feature in this situation.

By analyzing a sample of 398 CEO turnovers, we find evidence that is consistent with this suspected accounting behavior. We find less big bath accounting in firms where the new CEO is overconfident. Our findings are robust to alternative overconfidence classifications, big bath accounting definitions, the endogenous choice of hiring an overconfident CEO,

[28] It should be noted that we are only able to identify a small number of CFOs as overconfident or rational. This could limit the power of our empirical results in these tests.

endogenous big bath potential, and to several alternative explanations of accounting behavior at the turnover time, such as the turnover type (routine vs. non-routine), managerial compensation, and corporate governance mechanisms.

Our results imply that managerial overconfidence cannot be deemed as harmful in general but needs to be considered in the overall context. We highlight a situation where rational managers manipulate earnings for their private benefits, while overconfident managers see no need for such an activity.

Appendix A. Overconfidence Classification

We classify executives as overconfident if they ever retain an option until one year before expiration even though the option was at minimum 40 percent in the money at the time. Before 2006, ExecuComp contained information on option holdings only in an aggregated form and not at the grant level. Thus, we use information on the granting and exercising of options in order to infer the option holdings at a grant level. Option grants are provided in detail in the ExecuComp tables STGRTTAB and PLANBASEDAWARDS. Option exercises are only given in an aggregated form in the table ANNCOMP. Thus, ExecuComp only states how many options were exercised but not from which option grant. Therefore, we follow Hall and Liebman (1998) and assume a first-in first-out (FIFO) allocation rule in order to infer the option holdings per year. However, similar to Hall and Liebman (1998) we encountered several problems in the construction of the option holding portfolios. In the following, we describe the treatment of the respective issues.

Missing Information for Option Grants

For each option grant we need to know the number of options granted, the expiration date and the exercise price. Information on option grants is given in the ExecuComp tables STGRTTAB (for the years until 2006) and PLANBASEDAWARDS (for the years 2006 onwards). PLANBASEDAWARDS does not contain the expiration date of the grant but OUTSTANDINGAWARDS does and this can be added to the respective option grants. If the assignment of the exercise date was unclear, we assume that the options expire 10 years after the grant date as the median maturity for all option grants was 10 years. If the grant date was missing, we assume that the options were granted at fiscal year-end. If the exercise price was missing, we assume that the options were granted at the money and thus replaced missing exercise prices with the stock price of the company at the grant date as given by the

ExecuComp variable "mktpric" or, if this variable is not available, with the CRSP stock price of the company at the grant date.

Inconsistencies in Granted Options between PLANBASEDAWARDS & STGRTTAB and ANNCOMP

We compare whether the number of options granted given in the detail tables (STGRTTAB and PLANBASEDAWARDS) coincides with the information given in the general annual compensation table (ANNCOMP). In about 95 percent of the cases the information is the same. For the remaining observations the difference almost exclusively arises because there is information on granted options in ANNCOMP without any information on the grant details in either STGRTTAB or PLANBASEDAWARDS. In these cases, we add the information by assuming that the options were granted in a single grant at the money at fiscal year-end.

Gaps in Compensation Reporting

We check whether there are gaps in the compensation reporting in ExecuComp. If this is the case, we cannot track the exercise behavior of the executive and the construction of the annual option portfolios would be inaccurate. However, when there is only a one-year gap, the missing information can be added by comparing the option holdings of the previous and following years. When the number of options held was larger in the following year than in the previous year, we assume that the additional options were granted in a single grant at the money at fiscal year-end of the missing year. When the number of options in the following year was smaller than in the previous year, we assume that the difference was exercised in the missing year. In this we apply the first-in first-out principle and assume that the oldest options were exercised first.

Initial Option Holdings

In order to apply the FIFO-algorithm, we need to know the executive's entire history of option grants and exercises. However, sometimes the executive held options of the company before the first information on an option grant was listed in ExecuComp. If this was the case, we follow Hall and Liebman (1998) and assume that these options were granted three years earlier and have seven years left until expiration, i.e. they were granted with a 10-year maturity. We further assume that the options were granted at the money at fiscal year-end. To alleviate this problem, we again follow Hall and Liebman (1998) by tracking back option grants and exercises for 10 years before constructing the first option holding portfolio. Since ExecuComp covers data since 1992, we construct the first option holding portfolio for the year 2002. If the executive still holds options before 1992, we impose the assumptions discussed above.

Inconsistencies in Option Holdings between FIFO-Algorithm & ANNCOMP

Sometimes the FIFO-algorithm resulted in a different number of options held by the executive than the number stated in the annual compensation table ANNCOMP. If this was the case, we follow Hall and Liebman (1998) and impose the following assumptions to the option holdings. When the number of options held by the executive given in ANNCOMP is smaller than the number produced by the FIFO-algorithm, we assume that either some exercises are missing in ExecuComp or that some options have expired. Therefore, we subtract the difference from the oldest option grants. When the number of options held given in ANNCOMP is larger than the number given by the FIFO-algorithm, we assume that too many options were exercised and add back the exercised options until both numbers match. If adding back proved insufficient, the option holdings are rescaled proportionally such that they coincide with the number of options held given in ANNCOMP.

Adjustment for Stock Splits

The number of options held and the exercise price need to be adjusted for stock splits. We obtain information on stock splits directly from ExecuComp. When this information is missing we assume that there was no stock split in the given year.

Chance to Reveal Overconfidence

As discussed above, an executive needs to hold options until one year before expiration in order to be classified as overconfident. If ExecuComp does not cover this time period, no overconfidence can be identified. Therefore, we exclude all executives that had no chance to reveal themselves as being overconfident.

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Reporting Choices of Firms in European Exchange-Regulated Markets

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Abstract:

This paper investigates the reporting choices of firms in European exchange-regulated markets. In particular, it sheds light on the voluntary adoption of IFRS and on the decision to voluntarily provide quarterly financial data. The results show that less than 20% of the firms listed in the exchange-regulated markets of Amsterdam, Brussels, Lisbon, Frankfurt, and Paris voluntarily adopt IFRS and that less than 20% voluntarily provide quarterly reports. Even among the voluntary IFRS adopters more than 65% do not report quarterly. Determinant models reveal that the likelihood of voluntary IFRS adoption increases with the proportion of stocks sold to diversified investors upon IPO but the likelihood to report quarterly does not.

Keywords: *IFRS adoption, exchange-regulated markets, institutional investors, comparability, transparency*

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1. Introduction

Today many initial public offerings (IPOs) in Europe are not within the EU-regulated markets but in the European exchange-regulated markets. Since the start of the exchange-regulated Entry Standard of the Frankfurt Stock Exchange (FSE) in 2005 for example, there are more IPOs in the Entry Standard than in Frankfurts EU-regulated Prime and General Standard (105 vs. 93). Thus, European exchange-regulated markets are of growing importance.

Firms listed in these markets are usually not required to disclose any quarterly information and most exchange-regulated markets allow listed firms to choose between local GAAP and IFRS.[1] Regulation 2002/1606/EC of the European Parliament and the Council requires publicly listed European firms to prepare their consolidated financial statements in accordance with IFRS only if they are listed in a EU-regulated market. Hence, this does not apply to exchange-regulated markets (2002/1606/EC, Article 4).

Stock exchanges state that the main advantage of exchange-regulated markets are lower costs compared to EU-regulated markets especially due to lower disclosure requirements. Firms that self select into these markets can voluntarily provide more disclosure or voluntarily adopt IFRS. Then the question arises why these firms self select into a market with lower disclosure requirements in the first place. Therefore, the aim of this paper is to shed light on the reporting choices of firms listed in these markets. In particular, I am interested in the decision to voluntarily adopt IFRS at the admission to these markets and to voluntarily provide quarterly financial information after admission to these markets.

The sample consists of 226 new admissions to the exchange-regulated markets of Amsterdam, Brussels, Lisbon, Frankfurt, and Paris. First, I show that overall less than 20% of

[1] The notable exception is the Alternative Investment Market of the London Stock Exchange which requires IFRS since 2007.

firms voluntarily prepare their financial statements in accordance with IFRS. This finding suggests that most firms listed in exchange-regulated markets in Europe do not conclude that the benefits of IFRS outweigh the costs. Furthermore, less than 20% provide any quarterly financial information. Even among the voluntary IFRS adopters more than 65% of firms do not provide any quarterly information. Second, I separately investigate determinants of voluntary IFRS adoption and determinants of providing voluntary quarterly financial information.

The first determinant model reveals that firms are more likely to voluntarily adopt IFRS if they offer their stocks directly to institutional investors before the listing (private placement) compared to a public offer to all investors. Private placements to institutional investors hereby serve as a proxy for diversified investors in contrast to under-diversified retail investors (e.g. Goetzmann and Kumar, 2008). In a similar vein, I find that the proportion of institutional owners prior to the admission is positively linked to the probability of voluntarily adopting IFRS.

A future upgrade into a EU-regulated market is positively related to IFRS adoption. Furthermore, foreign firms and bigger firms are more likely do adopt IFRS voluntarily. This is in line with prior literature (Dumontier and Raffournier, 1998; Cuijpers and Buijink, 2005; Gassen and Sellhorn, 2006; Wu and Zhang, 2009).

The second determinant model shows that voluntary disclosure of quarterly financials is positively related to a future upgrade into a EU-regulated market, but not to the offers to institutional investors. Thus, firms voluntarily adopt IFRS and voluntarily provide quarterly information when anticipating a future upgrade into a EU-regulated market.

The finding that the proportion of diversified investors is positively associated with voluntary IFRS adoption, but not with an increase in quarterly reporting might be explained by the relative importance of comparability effects compared to transparency effects. Firms

that voluntarily adopt IFRS now use the same set of rules as firms of the EU-regulated markets. Diversified investors might benefit from these effects more than non-diversified retail investors since the same set of rules potentially reduces costs of managing their portfolio.

The contribution of the paper is twofold. First, I describe the reporting choices in European exchange-regulated markets and show that only a small fraction of firms listed in these markets voluntarily adopts IFRS or voluntarily provides quarterly financial information. Second, the results give some indications that diversified investors prefer the use of IFRS, but are not more interested in quarterly disclosure than non-diversified investors.

The remainder of the paper is organized as follows. In Section 2, I provide details about the exchange-regulated markets in Europe. Section 3 contains the related literature. In Section 4, I describe the sample and the research design. Section 5 presents and Section 6 discusses my results. Section 6 shows robustness tests and Section 7 concludes.

2. Institutional Setting

Regulation 2002/1606/EC requires listed firms to prepare their consolidated financial statements in accordance with the International Financial Reporting Standards (IFRS). More precisely, the regulation only requires firms that are listed in a EU-regulated market to use IFRS. Regulation 2002/1606/EC refers to Article 1(13) of Directive 93/22/EEC that provides a definition of EU-regulated markets. A EU-regulated market complies "with all reporting and transparency requirements laid down pursuant to Articles 20 and 21" (e.g. reporting prices every 20 minutes) and it "appears on the list". The latter requirement means that a market is EU-regulated if it is recognized as such by the respective authority. In a nutshell, stock exchanges can opt for a EU-regulated market or an exchange-regulated market. The responsible authorities are usually the Ministries of Finance or Economy of the respective

member state. The following table contains exchange-regulated markets within the EU that permit IFRS and local GAAP.

Table 1. European Exchange-Regulated Markets that Allow Voluntary IFRS Adoption

Market Segment	Stock Exchange	Listed Equities*
AIM Italia	Borsa Italiana	26
Entry Standard	Frankfurt Stock Exchange	187
Euro MTF	Bourse Luxembourg	260
m:access	Munich Stock Exchange	51
NYSE Alternext Amsterdam	New York Stock Exchange	2
NYSE Alternext Brussels	New York Stock Exchange	10
NYSE Alternext Lisbon	New York Stock Exchange	5
NYSE Alternext Paris	New York Stock Exchange	145
Third market	Vienna Stock Exchange	4

The table contains European exchange-regulated markets that allow listed firms to choose between IFRS and local GAAP.
* as of July 2013

Table 2 compares characteristics of the Frankfurt Stock Exchange market segments and the NYSE market segments in Amsterdam, Brussels, Lisbon and Paris. The minimum free float of the exchange-regulated market of the Frankfurt Stock Exchange (Entry Standard) is 10% versus 25% of the EU-regulated markets (Prime Standard and General Standard). The listing fees and ongoing fees of the EU-regulated markets are higher compared to the exchange regulated markets. The table only displays minimum fees; usually, fees are increasing in the value of listed shares.

Most exchange-regulated markets have different (lower) reporting requirements compared to EU-regulated markets. Both the Entry Standard of the Frankfurt Stock Exchange and the Alternext markets of the NYSE allow listed firms to choose between local GAAP and IFRS and do not require quarterly financial reports. Thus, this paper looks into the decisions of firms to voluntarily adopt IFRS and to voluntarily issue quarterly financial information. [2]

Furthermore, exchange-regulated markets are not subject to the enforcement systems that are required by the European Commission. Regulation 1606/2002/EC, which requires

[2] This paper does not include the Alternative Investment Market (AIM) of the London Stock Exchange (LSE) since the LSE requires AIM firms to use IFRS since 2007 and to publish shortened quarterly reports.

member states to install "appropriate measures to ensure compliance with international accounting standards" (Article 16), is only applicable for firms listed in EU-regulated markets.

Table 2. Characteristics of Selected Stock Market Segments

	Frankfurt Stock Exchange			NYSE (Amsterdam, Brussels, Lisbon, Paris)	
	EU-Regulated		Exchange-Regulated	EU-Regulated	Exchange-Regulated
Market Segment	Prime Standard	General Standard	Entry Standard	Euronext	Alternext
GAAP System	IFRS	IFRS	Local or IFRS	IFRS	Local or IFRS
Semi-Annual Statements	Yes	Yes	Yes	Yes	Yes
Quarterly Statements	Yes	No	No	Yes	No
Free Float	25%	25%	10%	25%	0%
Minimum Equity Capital	1,250,000	1,250,000	730,000	5,000,000	2,500,000
Preceding Years	3	3	2	2	2*
Minimum Admission Fee	5,500	5,500	750	10,000	9,000
Minimum Annual Fee	10,000	7,500	5,000	5,000	3,000

The table provides characteristics of the Frankfurt Stock Exchange market segments and the NYSE markets segments in Amsterdam, Brussels, Lisbon, and Paris.
* recommended

So far, only little research has been conducted in the exchange-regulated markets in Europe. Pownall and Wieczynska (2012) find that in 2009 16% of their sample of 2,580 listed EU firms are still using local GAAP. They conclude that firms from the Alternative Investment Market (AIM) of the London Stock Exchange (LSE) may drive this finding. Vismara et al. (2012) show that the performance in these secondary markets is worse than in the main markets (measured as buy-and-hold return). This result is consistent with the findings of Gerakos et al. (2013). They provide evidence that the performance of firms listed in the AIM is worse compared to firms of LSE's EU-regulated markets. A survey of the *Deutsches Aktieninstitut* (German Equities Institute, DAI) shows that 70% of the respondents are not satisfied with the liquidity of their shares in the Entry Standard of the Frankfurt Stock Exchange. Furthermore, 70% agree with the statement that the use of local GAAP is an advantage of this market segment. However, the survey is only based on 22 responses (out of

117 questionnaires). To my knowledge, there is no evidence on reporting decisions in the exchange-regulated markets.

To gain a deeper understanding on the characteristics of firms that list in exchange-regulated markets, I investigate determinants of firms listed in the Entry Standard and in the EU-regulated markets (Prime Standard and General Standard) of the Frankfurt Stock Exchange. Since the introduction of the Entry Standard in April 2005 there were 105 IPOs in the Entry Standard and 93 IPOs in the Prime and General Standard. Unreported results show that firms are more likely to list in the EU-regulated markets if the market capitalization and institutional ownership upon IPO are bigger. Average market capitalization of IPOs in the EU-regulated markets of the FSE is 656 million Euros and of the exchange-regulated Entry Standard 51 million Euros. Firms that perform an IPO in the exchange-regulated markets are more often owned by board members and their families compared to firms from the EU-regulated markets (50% vs. 20%).

3. Literature Review on Voluntary IFRS Adoption and Interim Reporting

There are some studies that focus on the determinants of voluntary IFRS adoption of publicly listed firms. The most common findings in single and cross-country studies are that voluntary adopters are more internationally oriented, more often cross-listed, and bigger (Dumontier and Raffournier, 1998; Cuijpers and Buijink, 2005; Gassen and Sellhorn, 2006; Wu and Zhang, 2009). Ownership concentration is negatively associated with the likelihood of firms adopting IFRS (Dumontier and Raffournier, 1998; Cuijpers and Buijink, 2005; Gassen and Sellhorn, 2006; Wu and Zhang, 2009; Günther et al., 2009).[3]

A few studies look into the determinants of voluntary IFRS adoption of private firms. Francis et al. (2008) provide evidence that especially internationally operating private firms and those seeking external financing adopt IFRS voluntarily. Bassemir (2012) finds that

[3] A detailed literature review of the determinants of voluntary IFRS adoption can be found in Andre et al. (2012).

German firms voluntarily adopting IFRS are bigger, externally rated, more leveraged, have a Big 5 auditor[4], more growth opportunities, a private equity investor, and seek public debt or equity financing. Andre et al. (2012) show that UK unlisted firms are more likely to adopt IFRS if they are bigger, more leveraged, internationally oriented, and have a Big 4 auditor. To the best of my knowledge, there is no study directly investigating voluntary adoption of IFRS in exchange-regulated markets.

The samples of most studies that focus on voluntary adoption of IFRS have a high proportion of German and Swiss companies. These studies find that adopting firms are relatively large and internationally oriented. For example, the average market capitalization of German voluntary adopters is 1,925 million Euros, 35% of sales are foreign sales and on average they are listed on 2.154 exchanges (Gassen and Sellhorn, 2006). Average total assets of the Swiss sample of Dumontier and Raffournier (1998) are 2,529 million Euros and foreign sales account for 55% of total sales. Thus, studies looking into determinants and consequences of those firms are not representative for firms listed in the European exchange-regulated markets. For comparison: Firms listed in the Entry Standard of the FSE have a market capitalization of 48 million Euros on average. Further, firms of the exchange-regulated markets are less often owned by institutional investors, but by managers and/or founders (and their families). Hence, there is no clear prediction to what extent firms of exchange-regulated markets voluntarily adopt IFRS.

Another stream of literature deals with interim disclosure. Increasing the frequency of disclosure can help to decrease information asymmetries and in turn can lead to more liquid capital markets (Botosan and Harris, 2000). The increase in frequency of disclosure can enhance the timeliness *and* the content of information. More timely information is useful for investors since it is closer to the time they trade. Higher frequency increases the content if

[4] In Germany, BDO is often viewed as one of the dominating auditors (besides Deloitte, Ernst & Young, KPMG, and PWC).

quarterly reports reveal information about seasonal trends (Botosan and Harris, 2000). Butler et al. (2007) find that for firms issuing voluntarily quarterly financial statements the timeliness of earnings increase.

The downside of increasing the frequency, however, is managers' deviation of otherwise optimal behavior. Bhojraj and Libby (2005) show that when managers are faced with high capital market pressure, managers behave more myopically when they report quarterly compared to semi-annually. The authors explain this finding by the conflict between short-term earnings incentives and total cash flows. Similarly, Ernstberger et al. (2011) find that increased frequency of disclosure can lead to more real activities manipulation to meet and beet quarterly earnings benchmarks. Another drawback of quarterly reporting is a potential increase in price volatility (Rahman et al., 2007).

4. Sample and Research Design

4.1 Sample

The sample consists of all IPOs, private placements and direct listings in the European exchange-regulated markets of Amsterdam, Brussels, Lisbon, Frankfurt, and Paris for the years 2005-2012.[5] Within an IPO, firms raise capital and frequently offer shares of the existing shareholders. Private placements are offers in form of a capital increase to qualified investors only prior to a listing.[6] Article 2 of Directive 2003/71/EC defines and gives examples of qualified investors (e.g. credit institutions, investment firms, and insurance companies).[7] Direct listings are only the admission to a market without capital raised. The

[5] All of the mentioned exchanges were installed in 2005 or thereafter.

[6] The following quote illustrates the information, which is given upon a listing at the Paris Alternext market segment. "*Admission on Alternext 2,543,318 existing shares representing the outstanding capital of ASTELLIA. This admission takes place after a Private Placement of M€ 10 subscribed by qualified investors (M€ 8 from a capital increase)*" (admission of Astellia on 12/17/2007).

[7] Natural persons can be authorized as qualified investors by member states if they exceed two of the following criteria: at least 10 transactions of significant size in each of the last four quarters, at least one year of professional experience, the investors' portfolio exceeds 0.5 million Euros (2003/71/EC Article 2).

sample does not include dual listings (cross-listings) from other markets or downlistings from EU-regulated markets since the incentive schemes might be different.

In total, I found 251 new admissions. Due to data availability (missing prospectus or missing capital market data) the sample reduces to 226 firms. The data is hand collected and mostly stems from issued prospectus and financial statements. Data is gathered from the Frankfurt Stock Exchange, German Federal Financial Advisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, Bafin), the German Federal Gazette, New York Stock Exchange and the companies.

Table 3 shows that 45 out of 226 firms (19.9%) decided to voluntarily adopt IFRS and 42 (18.6%) decided to provide quarterly information upon their admission to the European exchange-regulated markets. These descriptive results indicate that most managers do not consider IFRS adoption or providing quarterly information to be beneficial for them.

Table 3. Reporting Choices in Exchange-Regulated Markets

Panel A: IFRS in Exchange-Regulated Markets

IFRS	Amsterdam	Brussels	Frankfurt	Lisbon	Paris	Sum
0	0	6	68	2	105	181
1	1	2	24	0	18	45
Sum	1	8	92	2	123	226

Panel B: Quarterly Reporting in Exchange-Regulated Markets

Quarter	Amsterdam	Brussels	Frankfurt	Lisbon	Paris	Sum
0	1	7	68	1	107	184
1	0	1	24	1	16	42
Sum	1	8	92	2	123	226

IFRS is coded one if the company voluntarily adopted the International Financial Accounting Standards (IFRS) in the year of their admission to the exchange-regulated market and zero otherwise. *Quarter* is coded one if the company gives at least some information (e.g. sales and earnings) about quarterly financials.

4.2 Research Design

The research design is presented in Formula (1) and (2). The first model estimates a cross-sectional logistic regression where the dependent variable is coded one if the company voluntarily adopts IFRS in the year of the admission to the exchange-regulated market and

zero otherwise. All models use robust standard errors and include industry, time (year), and listing (Entry Standard or Alternext) fixed effects (FE) when indicated.

Cost and benefits of IFRS adoption might vary for firms listed in the exchange-regulated markets compared to firms listed in EU-regulated markets because of the following differences: First, prior literature finds that larger firms are more likely to voluntarily adopt IFRS (Dumontier and Raffournier, 1998; Murphy, 1999; Cuijpers and Buijink, 2005; Gassen and Sellhorn, 2006; Wu and Zhang, 2009), indicating that, for them, adoption is relatively less costly. Second, firms listed in exchange-regulated markets often operate in a domestic environment. If various stakeholders (e.g. shareholders, creditors, debitors, employees) are not internationally diversified, there might be less demand for IFRS. And third, ownership structure differs from large listed companies, which might influence the likelihood of firms voluntarily adopting IFRS.

$$\begin{aligned}\text{prob}(IFRS) = \text{logit}(&\beta_0 + \beta_1 * placement + \beta_2 * foreign + \beta_3 * big5 \\ &+ \beta_4 * freefloat + \beta_5 * size + \beta_6 * ROA + \beta_7 * leverage \\ &+ \beta_8 * fsales + \beta_9 * upgrade + \sum_{i=10}^{n} \beta_i * FE)\end{aligned} \tag{1}$$

Firms listed in European exchange-regulated markets can voluntarily increase their level of transparency by following rules that are mostly required in EU-regulated markets (see Table 1). In particular, I examine an increase in the frequency of disclosure (from semi-annual to quarterly). Thus, the second model estimates a logistic regression where the dependent variable is coded one if the company voluntarily provided quarterly information after the admission to the exchange-regulated market and zero otherwise. *Quarter* is coded one if the company gives at least some information (e.g. sales and earnings) about quarterly financials.

$$\begin{aligned}\text{prob}(quarter) = \text{logit}(&\beta_0 + \beta_1 * placement + \beta_2 * foreign + \beta_3 * big5 \\ &+ \beta_4 * freefloat + \beta_5 * size + \beta_6 * ROA + \beta_7 * leverage \\ &+ \beta_8 * fsales + \beta_9 * upgrade + \sum_{i=10}^{n} \beta_i * FE)\end{aligned} \tag{2}$$

Diversified investors might have different information needs than non-diversified investors. For them, IFRS might make it less costly to manage their portfolio and to decide between investment opportunities. This argument is in line with the finding of Florou and Pope (2012). They show that after mandatory IFRS adoption institutional ownership increases for adopters more than for non-adopters.

Non-institutional investors are often under-diversified (e.g. Goetzmann and Kumar, 2008) and might benefit less from IFRS or quarterly reporting. Ernst et al. (2009) show that retail investors use financial statements differently than institutional investors. Retail investor often prefer filtered information like press news or analyst recommendation (Ernst et al., 2009). The first independent variable (*placement*) is a proxy for diversified investors (in contrast to retail investors). *Placement* is coded one if a company offers their stocks to institutional investors prior to the listing.

Firms located outside the country where they are listed (*foreign*) can choose to adopt IFRS or the respective local GAAP system. In line with prior research (Dumontier and Raffournier, 1998; Cuijpers and Buijink, 2005; Gassen and Sellhorn, 2006; Wu and Zhang, 2009) I expect these firms to voluntarily adopt IFRS. Furthermore, foreign firms might have different incentives to provide voluntary disclosure. To further control for internationally oriented firms I include the proportion of sales that is realized outside the country where the company is located (*fsales*).

Reporting choices may be correlated with the reputation of the auditor. Firms might enhance the reliability of financial reports by choosing an auditor with high reputation (Dumontier and Raffournier, 1998). Furthermore, bigger audit firms might be more

experienced with IFRS and capital market disclosure. *Big5* is a dummy variable coded one if the company is audited by one of the dominating auditors in the respective country and zero otherwise. In addition to the Big4 international auditing firms (Deloitte, Ernst & Young, KPMG, and PWC), I consider BDO in Germany and Hazars in France to belong to the dominating auditing firms in the respective country.

I expect reporting choices to be positively correlated with firm size. Providing disclosure incurs fixed costs and bigger firms are more likely to have prepared the data already for internal evaluation purposes. Further, implementing IFRS should be relatively less costly for bigger firms compared to smaller firms (Dumontier and Raffournier, 1998). *Size* is the natural logarithm of total assets (in thousand Euros).

When firms are financed through bank loans the borrower might be able to seek information directly from companies. Thus, highly leveraged firms might have different incentives for reporting than firms with a lower level of leverage. I include *leverage*, the ratio of non-equity to total assets.

Firms with a more dispersed ownership structure after admission to the exchange-regulated markets have different reporting incentives than closely held firms. They might benefit more from voluntary disclosure to reduce information asymmetries between managers and non-controlling owners. *Newstocks* is the ratio of newly issued stocks to existing stocks.

Return on asset (*ROA*) is included to control for profitability and calculated as Earnings before Interest and Tax (EBIT) divided by total asset at year-beginning. More profitable firms might have the resources to increase voluntary reporting. Furthermore, costly reporting can potentially be used as a signal to capital markets.

Companies may voluntarily adopt IFRS and voluntarily provide quarterly financial information in anticipation of a future admission to a EU-regulated market. Thus, I include

upgrade which is coded one if the company switched to a EU-regulated after the listing in the exchange-regulated market.

4.3 Univariate Results

Firms that decide to list in exchange-regulated markets have the choice to adopt IFRS and to voluntarily provide quarterly financial information. Table 4 gives the respective contingencies. Most firms (153) use local GAAP and do not provide quarterly information. Approximately 15% choose to either use IFRS or to report quarterly information. Only the minority of firms (6.2%) provide quarterly information *and* voluntary report quarterly financial information.

Table 4. Contingency Table – Full Sample

	quarter=0	*quarter*=1	Sum
IFRS = 0	153	28	181
IFRS = 1	31	14	45
Sum	184	42	226

The table provides the contingencies of voluntary IFRS adoption and voluntary giving quarterly information. *IFRS* is coded one if the company voluntarily adopted the International Financial Accounting Standards (IFRS) in the year of their admission to the exchange-regulated market and zero otherwise. *Quarter* is coded one if the company gives at least some information (e.g. sales and earnings) about quarterly financials.

Table 5 gives the summary statistics partitioned into non-adopters (*IFRS* = 0) and voluntary IFRS adopters (*IFRS* = 1). All financial statement variables are gathered from the last full annual (12 month) report prior to the admission. The results show that approximately 65% of the voluntary IFRS adopters do not give any information about quarterly financial data.

On average, voluntary IFRS adopters offer shares more often to institutional investors in form of private placements (*placement*). The difference is statistically significant (p-Value < 0.01). In line with prior literature, voluntary adopters are more often located in a country outside the country where they are listed (*foreign*). With the exception of two Chinese firms and one from British Virgin Island, all foreign firms are located in another EU member state.

Voluntary adopters switch more often into a EU-regulated market (*upgrade*) and are bigger at the timing of the listing (*size*). These differences are statistically significant. All

other variables are not statistically different between the two groups. Standard deviations of *ROA* and *leverage* are relatively large, presumably due to startup firms that tend to be very profitable or very unprofitable.

Table 5. Summary Statistics – Full Sample

IFRS = 0	N	Mean	Sd	Min	P25	Median	P75	Max
quarter	181	0.15	0.36					
placement	181	0.39	0.49					
foreign	181	0.02	0.15					
upgrade	181	0.03	0.16					
big5	181	0.29	0.46					
newstocks	181	0.29	0.25	0.00	0.15	0.26	0.38	2.12
size	181	9.14	1.18	5.99	8.27	9.04	9.80	14.43
ROA	181	-0.01	0.42	-3.08	0.00	0.04	0.12	1.02
leverage	181	0.61	0.29	0.00	0.44	0.62	0.80	1.87
fsales	181	0.23	0.31	0.00	0.00	0.02	0.45	1.00
IFRS = 1	N	Mean	Sd	Min	P25	Median	P75	Max
quarter	45	0.31**	0.47					
placement	45	0.73***	0.45					
foreign	45	0.22***	0.42					
upgrade	45	0.13***	0.34					
big5	45	0.29	0.46					
newstocks	45	0.34	0.42	0.00	0.12	0.23	0.35	2.35
size	45	9.64**	1.21	7.11	9.06	9.67***	10.46	12.41
ROA	45	0.03	0.24	-0.84	0.00	0.04	0.16	0.44
leverage	45	0.55	0.27	0.03	0.32	0.63	0.77	0.98
fsales	45	0.28	0.35	0.00	0.00	0.03	0.56	1.00

The table reports summary statistics partitioned by *IFRS*. *IFRS* is coded one if the company voluntarily adopted the International Financial Accounting Standards (IFRS) in the year of their admission to the exchange-regulated market and zero otherwise. *Quarter* is coded one if the company gives at least some information (e.g. sales and earnings) about quarterly financials. *Placement* is coded one if the company offers stocks only to institutional investors prior to the listing. *Foreign* is coded one if the company is located in a country outside its listed exchange-regulated market. *Upgrade* is coded one if the company switched to a EU-regulated market at some point after the listing in the exchange-regulated market. *Big5* is a dummy variable coded one if the company is audited by one of the dominating auditors. *Newstocks* is the ratio of newly issued stocks to existing stocks. *Size* is the natural logarithm of total assets (in thousand Euros). *ROA* is return on assets. *Leverage* is the ratio of non-equity to total assets. *Fsales* is the proportion of sales that is realized outside the country where the company is located. ***/**/* marks significance at the 1/5/10% level based on the two tailed t-test of the mean, the chi2 test of the mean of the dichotomous variables and the Wilcoxon rank test of the median.

Pearson and Spearman correlations are given in Table 6. The proxy for diversified investors (*placement*) is highly correlated with voluntary IFRS adoption. Further, *placement* is weakly significantly correlated with giving quarterly information (*quarter*, p-Value <0.1).

These results have to be interpreted with caution since *upgrade* is positively correlated with *IFRS* and *quarter* as well. This means that the results could be driven by firms that switch to a EU-regulated market. *IFRS* is positively correlated with *foreign* and *size*. In line with prior literature, bigger firms and foreign firms are more likely to voluntarily adopt IFRS.

Table 6. Pearson and Spearman Correlations – Full Sample

Variable	*IFRS*	*quarter*	*placement*	*foreign*	*upgrade*	*big5*	*newstocks*	*size*	*ROA*	*leverage*	*fsales*
IFRS		0.16**	0.27***	0.33***	0.20***	-0.00	0.07	0.17**	0.04	-0.09	0.07
quarter	0.16**		0.13*	0.02	0.31***	-0.01	0.01	0.09	0.11*	-0.17**	0.08
placement	0.27***	0.13*		0.24***	0.12*	-0.13*	0.18***	0.06	-0.07	-0.03	0.02
foreign	0.33***	0.02	0.24***		0.03	0.04	-0.04	0.08	0.04	0.06	0.12*
upgrade	0.20***	0.31***	0.12*	0.03		-0.01	0.11	-0.05	0.04	-0.03	-0.05
big5	0.00	-0.01	-0.12**	-0.04	-0.01		-0.02	0.03	-0.11*	0.04	0.14
newstocks	-0.04	0.07	0.21***	-0.04	0.01	-0.05		-0.09	-0.09	-0.09	-0.01
size	0.19***	0.12*	0.09	0.08	-0.05	-0.02	-0.12*		0.21***	0.07	0.10
ROA	0.03	0.09	-0.09	0.08	0.00	-0.11*	-0.11	-0.08		-0.13*	0.07
leverage	-0.06	-0.16**	-0.04	0.03	-0.04	-0.02	0.08	0.15**	-0.14**		-0.08
fsales	0.03	0.12*	-0.02	0.10	-0.05	0.12	0.07	0.07	0.07	-0.10	

The table provides Spearman correlations below the diagonal and Pearson correlations above the diagonal. *IFRS* is coded one if the company voluntarily adopted the International Financial Accounting Standards (IFRS) in the year of their admission to the exchange-regulated market and zero otherwise. *Quarter* is coded one if the company gives at least some information (e.g. sales and earnings) about quarterly financials. *Placement* is coded one if the company offers stocks only to institutional investors prior to the listing. *Foreign* is coded one if the company is located in a country outside its listed exchange-regulated market. *Upgrade* is coded one if the company switched to a EU-regulated market at some point after the listing in the exchange-regulated market. *Big5* is a dummy variable coded one if the company is audited by one of the dominating auditors. *Newstocks* is the ratio of newly issued stocks to existing stocks. *Size* is the natural logarithm of total assets (in thousand Euros). *ROA* is return on assets. *Leverage* is the ratio of non-equity to total assets. *Fsales* is the proportion of sales that is realized outside the country where the company is located. ***/**/* marks significance at the 1/5/10% level.

5. Multivariate Results

5.1 Voluntary IFRS Adoption

5.1.1 Determinants Model

The multivariate results are displayed in Table 7. The only difference between Model 1 and Model 2 is that *upgrade* is included as a control variable in Model 1. The reason for two different models is that a future upgrade to a EU-regulated market is only observable if the admission to the exchange-regulated market was not recent and the firm had time to upgrade. Furthermore, a future upgrade might be correlated with other control variables. Although *upgrade* has a significant influence on the probability to adopt IFRS, all other results remain relatively constant. The models show that the probability of adopting IFRS is positively related to private placement (*placement*), foreign listings (*foreign*), *size* and a future upgrade to a EU-regulated market. In unreported results I include the interaction of *upgrade* and *placement* in Model 2. The results stay qualitatively the same and the coefficient of the interaction term does not show statistical significance.

5.1.2 Underwriting

Firms that list their shares for the first time hire an underwriter to conduct the listing. Thus, another determinant of voluntary IFRS adoption might be that it is the underwriter who decides upon the accounting regime. I do not find any systematic pattern among the underwriters to choose a specific GAAP system. In general, incentives of the underwriter and the firm typically align since underwriters charge commissions depending on the success of the listing. In total, firms of the sample use 69 different underwriters. The multivariate regressions do not include fixed effects for different underwriters as this would reduce the degrees of freedom significantly.

Table 7. Voluntary IFRS Adoption – Full Sample

	Model 1	Model 2
Dependent variable:	*IFRS*	*IFRS*
placement	1.328***	1.347***
	(0.472)	(0.467)
foreign	2.416***	2.279***
	(0.841)	(0.806)
big5	0.255	0.271
	(0.456)	(0.474)
newstocks	0.570	0.449
	(0.524)	(0.611)
size	0.368*	0.436*
	(0.211)	(0.228)
ROA	0.539	0.407
	(0.564)	(0.605)
leverage	-0.899	-0.868
	(0.779)	(0.722)
fsales	-0.225	-0.104
	(0.689)	(0.681)
upgrade		2.394***
		(0.735)
Listing FE	Yes	Yes
Industry FE	Yes	Yes
Time FE	Yes	Yes
Constant	Yes	Yes
LR	0.004	0.005
R-squared	0.261	0.300
N	226	226

The table provides the results of the logistic regressions of voluntary adoption of IFRS at the admission to the exchange-regulated market. *IFRS* is coded one if the company voluntarily adopted the International Financial Accounting Standards (IFRS) in the year of the admission to the exchange-regulated market and zero otherwise. *Placement* is coded one if the company offers stocks only to institutional investors prior to the listing. *Foreign* is coded one if the company is located in a country outside its listed exchange-regulated market. *Big5* is a dummy variable coded one if the company is audited by one of the dominating auditors. *Newstocks* is the ratio of newly issued stocks to existing stocks. *Size* is the natural logarithm of total assets (in thousand Euros). *ROA* is return on assets. *Leverage* is the ratio of non-equity to total assets. *Fsales* is the proportion of sales that is realized outside the country where the company is located. *Upgrade* is coded one if the company switched to a EU-regulated market at some point after the listing in the exchange-regulated market. Robust standard errors are provided within the brackets below the coefficients. ***/**/* marks significance at the 1/5/10% level.

5.1.3 Upgrade to a EU-Regulated Market

Companies might use exchange-regulated markets as a first step to upgrade into EU-regulated markets. Those firms might have the incentive to voluntarily adopt IFRS right from the beginning since firms in EU-regulated markets are required to use IFRS. Thus, the incentive structure of those firms is different from those that are not planning to upgrade. The models used so far include a dummy which is one if the respective companies choose to

upgrade at some point in time. As stated earlier, this is only observable if the listing in the exchange-regulated market was not recent. Almost all upgrading firms of the sample (except for two) listed in the exchange-regulated markets between 2005 and 2007. Of those, all but one upgraded within three years. Thus, I assume that if I restrict the sample to the years 2005 – 2007, firms that wanted to upgrade had the time to do so. Table 8 gives the results of the sample of firms which listed for the first time on the exchange-regulated markets between 2005 and 2007. The sample excludes firms that upgrade to a EU-regulated market. The results stay qualitatively the same. One limitation of this analysis is that it only controls for actual upgrades in EU-regulated markets, not expected upgrades. It might be that firms adopt IFRS in anticipation of a future upgrade but then do not upgrade due to unexpected performance or unexpected decline in growth.

5.1.4 Label Adopters

Daske et al. (2013) divide their sample of voluntary IFRS adopters in "label adopters" and "serious adopters" and find that positive capital market consequences (increases in liquidity and decreases in cost of capital) only occur among those companies that have an incentive to change their reporting behavior (serious adopters). The authors use, among others, a classification scheme based on reporting incentives. They argue that serious adopters are larger, more profitable, have larger financing needs, larger growth opportunities, more dispersed ownership, and stronger incentives for transparent information.

One could argue that firms of the exchange-regulated markets should be serious adopters since they voluntarily adopt IFRS. Hence, benefits of adoption should outweigh costs. Contrary, it might be that firms voluntarily adopt IFRS because they are required by e.g. equity or debt providers. In this case, they might just adopt the label of IFRS reporting without really applying the rules. Thus, these firms can be label adopters.

Table 8. Voluntary IFRS Adoption, 2005 - 2007

	Model 1	Model 2
Dependent variable:	*IFRS*	*quarter*
placement	1.889***	0.447
	(0.633)	(0.639)
foreign	4.720***	-1.382
	(1.041)	(0.911)
big5	0.374	0.473
	(0.654)	(0.598)
newstocks	-4.296**	1.128
	(2.062)	(1.085)
size	0.439	0.515**
	(0.347)	(0.252)
ROA	2.776	1.435
	(2.225)	(1.244)
leverage	2.149	-2.859**
	(1.346)	(1.121)
fsales	-0.879	1.014
	(1.346)	(0.828)
Listing FE	Yes	Yes
Industry FE	Yes	Yes
Time FE	Yes	Yes
Constant	Yes	Yes
LR	0.0001	0.0224
R-squared	0.3616	0.2058
N	157	157

The table provides the results of the logistic regressions of the voluntary adoption of IFRS and voluntary issuance of quarterly and corporate governance information at the admission the exchange-regulated market. The sample is restricted to listings between 2005 and 2007. *IFRS* is coded one if the company voluntarily adopted the International Financial Accounting Standards (IFRS) in the year of their admission to the exchange-regulated market and zero otherwise. *Quarter* is coded one if the company gives at least some information (e.g. sales and earnings) about quarterly financial data. *Institutional* is the natural logarithm of the value of stocks offered to institutional investors. *Retail* is the natural logarithm of the value of stocks offered to retail investors. *Instown* is the percentage of ownership from institutional investors. *Foreign* is coded one if the company is located in a country outside its listed exchange-regulated market. *Big5* is a dummy variable coded one if the company is audited by one of the dominating. *Size* is the natural logarithm of total assets (in thousand Euros). *ROA* is return on assets. *Leverage* is the ratio of non-equity to total assets. *Fsales* is the proportion of sales that is realized outside the country where the company is located. *Upgrade* is coded one if the company switched to a EU-regulated market at some point after the listing in the exchange-regulated market. Robust standard errors are provided within the brackets below the coefficients. ***/**/* marks significance at the 1/5/10% level.

My tests are not designed to make any inference in this respect. The only surprising result is the low frequency of Big5 auditing firms among the IFRS adopters (29%). According to Daske et al. (2013) serious adopters have incentives for transparent information, so that (serious) voluntary adopters should choose auditors that provide high quality audits. Big5 auditors often serve as a proxy for audit quality, especially since Big5 auditors are more experienced with IFRS.

5.1.5 Anticipation of Future Mandatory IFRS Adoption

Another incentive to adopt IFRS might be the anticipation of a future requirement to use IFRS in exchange-regulated markets. This would cause cross-sectional differences in adopting behavior if some firms still list after IFRS is mandatory and some firms delist from the capital markets. To the best of my knowledge, there is no discussion of respective stock exchanges to change their rules regarding the use of IFRS. Instead, they point out that the choice about the accounting regime is an advantage compared to the EU-regulated market. Furthermore, I could not find any evidence that the European Commission wants to change the rules for exchange-regulated markets. The only current discussion is about extending IFRS to small and medium sized private companies (IFRS for SMEs). In this case, all firms are affected by the regulation and there should be no (or at least fewer) cross-sectional differences.

5.1.6 Influence of a Parent Company

The models do not include a variable that captures whether listed firms are part of a group. I observe the ownership structure prior to the admission to the exchange-regulated markets and can rule out that sample firms are subsidiaries within a group. Hence, there are no incentives stemming from a parent company to voluntary adopt IFRS or to voluntary provide quarterly information.

5.2 Voluntary Quarterly Disclosures

Table 9 uses *quarter* as dependent variable instead of *IFRS*. The models estimate the likelihood of issuing quarterly information. As before, the models differ with respect to the *upgrade* variable. The table shows that firms that upgrade into the EU-regulated markets are more likely to voluntarily give quarterly financial information. Also, the models show that *placement* is not significantly correlated with the dependent variable.

The only other coefficient that shows statistical significance is *leverage*. Firms with a higher leverage ratio are less likely to publish quarterly information. This finding could be explained by relationships to banks. Especially smaller private firms in Europe (before the IPO) are often financed through one bank (Peek et al., 2010). This bank might be able to seek information directly from the company and is thus not dependent on voluntary disclosure.

Table 9. Quarterly Reporting – Full Sample

	Model 1	Model 2
Dependent variable:	*quarter*	*quarter*
placement	0.551	0.291
	(0.421)	(0.459)
foreign	-0.041	-0.309
	(0.991)	(0.853)
big5	0.354	0.361
	(0.461)	(0.489)
newstocks	-0.458	-0.912
	(0.628)	(1.520)
size	0.267	0.281
	(0.173)	(0.183)
ROA	1.019	1.089
	(0.699)	(0.790)
leverage	-2.299***	-2.442***
	(0.781)	(0.904)
fsales	0.571	0.912
	(0.606)	(0.611)
upgrade		3.776***
		(1.126)
Listing FE	Yes	Yes
Industry FE	Yes	Yes
Time FE	Yes	Yes
Constant	Yes	Yes
LR	0.086	0.001
R-squared	0.152	0.232
N	226	226

The table provides the results of the logistic regressions of voluntary issuance of quarterly information after the admission to the exchange-regulated market. *Quarter* is coded one if the company gives at least some information (e.g. sales and earnings) about quarterly financial data. *Placement* is coded one if the company offers stocks only to institutional investors prior to the listing. *Foreign* is coded one if the company is located in a country outside its listed exchange-regulated market. *Big5* is a dummy variable coded one if the company is audited by one of the dominating auditors. *Newstocks* is the ratio of newly issued stocks to existing stocks. *Size* is the natural logarithm of total assets (in thousand Euros). *ROA* is return on assets. *Leverage* is the ratio of non-equity to total assets. *Fsales* is the proportion of sales that is realized outside the country where the company is located. *Upgrade* is coded one if the company switched to a EU-regulated market at some point after the listing in the exchange-regulated market. Robust standard errors are provided within the brackets below the coefficients. ***/**/* marks significance at the 1/5/10% level.

6. Discussion of Results

6.1 Comparability vs. Transparency Arguments

Table 7 and Table 9 show that the proxy for diversified investors (*placement*) is positively related to voluntary IFRS adoption but not to voluntary quarterly reporting. This section discusses the different results with respect to diversified investors.

In Table 10 *quarter* is included as independent variable into the models where *IFRS* is the dependent variable and vice versa. Further, interactions of these variables with *placement* are included. The interaction term in Model 1 should be positively significant if firms that perform a private placement and publish voluntary quarterly information are more likely to adopt IFRS voluntarily. Neither *quarter* nor the interaction term shows statistical significance. This indicates that the positive relationship between placement and voluntary IFRS adoption is unconditional on the decision to report quarterly.

Model 2 shows that *IFRS* is weakly associated with *quarter*. Neither *placement* nor the interaction of *placement* and *IFRS* show statistical significance. These results indicate that private placements do not influence the decision to engage in voluntary quarterly reporting.

The findings of Table 7, Table 9 and Table 10 can be interpreted along the following lines: Institutional investors demand IFRS adoption, but do not demand quarterly reporting. A possible explanation for the different incentives could be the relative importance of comparability and transparency.

I consider financial statements to be comparable if the underlying accounting systems capture economic events in the same way. This implies that when a company switches from GAAP system ‘A’ to GAAP system ‘B’, financial statements are now more comparable to financial statements of firms using system ‘B’, but less comparable to firms using system ‘A’. It implies that investors who are used to system ‘B’ no longer have to reconcile financial data. Thus, the switch to GAAP system ‘B’ makes it less costly for these investors to manage their

portfolio. Therefore, a switch to another accounting regime decreases costs for one group of investors, but increases the costs for another. The underlying assumption is that investors are able to reconcile information between GAAP systems.

Table 10. Interaction Models – Full Sample

	Model 1	Model 2
Dependent variable:	*IFRS*	*quarter*
placement	1.389**	0.336
	(0.566)	(0.551)
quarter	0.972	
	(0.914)	
*placement*quarter*	-0.517	
	(1.059)	
IFRS		1.403*
		(0.761)
*placement*IFRS*		-1.119
		(1.038)
Controls	Yes	Yes
Listing FE	Yes	Yes
Industry FE	Yes	Yes
Time FE	Yes	Yes
Constant	Yes	Yes
LR	0.009	0.001
R-squared	0.306	0.244
N	226	226

The table provides the results of the logistic regressions of regressions of the voluntary adoption of IFRS and voluntary issuance of quarterly at the admission to the exchange-regulated market. *IFRS* is coded one if the company voluntarily adopted the International Financial Accounting Standards (IFRS) in the year of the admission to the exchange-regulated market and zero otherwise. *Quarter* is coded one if the company gives at least some information (e.g. sales and earnings) about quarterly financial data. *Placement* is coded one if the company offers stocks only to institutional investors prior to the listing. Robust standard errors are provided within the brackets below the coefficients. ***/**/* marks significance at the 1/5/10% level.

On the one hand, firms that voluntarily switch to IFRS are likely more comparable to all firms from the major European EU-regulated stock markets since they now use the same set of rules. This applies to firms of the national EU-regulated stock market (within a country) and other EU-regulated stock markets (cross-country). Thus, I consider the voluntary switch of firms listed in European exchange-regulated markets to IFRS after 2005 to be an increase in comparability.

On the other hand, these firms become less comparable to their peers from the exchange-regulated markets (if the majority of them sticks to local GAAP). Since the market

value of the major markets exceeds the market value of the exchange-regulated markets multiple times, I consider a switch to IFRS as an increase in comparability.

Evidence of the first order effects, comparability and transparency, is mixed (Brüggemann et al. 2013). In a cross-country study, Yip and Young (2012) provide evidence that information comparability increases within Europe. Cascino and Gassen (2014) find only a limited comparability effect of mandatory IFRS adoption within industries across countries. The authors explain difference in comparability by firm-level heterogeneity in IFRS compliance and cross-country differences in enforcement.

Institutional investors are often well diversified and benefit (more) from standardized information about their investments (in contrast to under-diversified retail investors, e.g. Goetzmann and Kumar, 2008). Ball (2006) argues that the benefits of IFRS "would be greatest for institutions that create large, standardized format financial databases". Thus, diversified investors might prefer IFRS since the adoption could potentially reduce the costs of managing their diversified portfolio.

For non-diversified investors comparability might be important when they want to sell or buy stocks. Surveys find that retail investors often do not use data from financial reports and instead use filtered information by financial intermediaries like press news (e.g. Ernst et al., 2009). Thus, individual investors benefit less from comparability compared to institutional investors.

A possible explanation why the proxy of diversified investors is not related to quarterly reporting (Table 9) might be that institutional investors prefer opaque financial reporting because they benefit from acquiring private information (Maffett, 2012). Hence, institutional investors might not demand more information than retail investors. I understand transparency as the ability of financial reporting to reveal the underlying economics of a firm.

An increase in transparency is either increasing the quality (reliability), the quantity or the frequency of value relevant information.

6.2 Length of Financial Statements

The previous subsection revealed that proxies for diversified investors are related to IFRS adoption, but not related to the decision to voluntarily disclose quarterly financials. Furthermore, statistics of Table 4 show that the majority of voluntary IFRS adopters do not voluntarily provide quarterly financial information. This raises the question whether the adoption of IFRS in the exchange-regulated markets increases transparency.

This subsection investigates the level of disclosure within the annual financial statements, measured as the number of words. I conduct this analysis only within the Entry Standard of the Frankfurt Stock Exchange. The reason for this is that all German firms have to publish their annual statements online with the German Federal Gazette. The advantage is that, usually, the annual statement is to some degree standardized and does not contain non-GAAP parts such as environmental or social disclosures.

Furthermore, annual reports from the Alternext sample are not always available. I restrict the sample to firms that are not small according the German Commercial Code since small firms have lower disclosure requirements (e.g. they are not required to report a profit and loss statement).[1]

Summary statistics are displayed in Table 11. The mean of the length of the financial statement, measured as the number of words deflated by total assets (*words*), is statistically different between the two groups, but the median is not. Measured as the natural logarithm (*ln_words*) both the mean and the median are statistically higher among the IFRS adopters.

[1] Firm are considered to be not small if they exceed two of following thresholds in two consecutive years: (1) 4,840,000 Euro total assets, (2) 9,680,000 Euro sales and (3) 50 employees (§ 267 (1) HGB).

Table 11. Summary Statistics – Entry Standard Sample

IFRS = 0	N	Mean	Sd	Min	P25	Median	P75	Max
placement	57	0.61	0.49					
upgrade	57	0.05	0.23					
big5	57	0.18	0.38					
words	57	0.93	1.00	0.06	0.34	0.59	1.27	4.58
ln_words	57	8.79	0.66	7.05	8.41	8.90	9.22	9.97
newstocks	57	0.26	0.19	0.00	0.10	0.26	0.41	0.85
size	57	9.33	1.20	7.04	8.43	9.36	10.37	11.46
ROA	57	0.03	0.17	-0.78	0.01	0.05	0.11	0.45
leverage	57	0.59	0.32	0.01	0.41	0.65	0.78	1.52
fsales	57	0.19	0.27	0.00	0.00	0.00	0.34	0.91
IFRS = 1	N	Mean	Sd	Min	P25	Median	P75	Max
placement	19	0.89**	0.32					
upgrade	19	0.21**	0.42					
big5	19	0.05	0.23					
words	19	2.12**	3.38	0.02	0.35	0.68	1.50	11.75
ln_words	19	9.31***	0.66	7.53	9.04	9.51***	9.73	10.05
newstocks	19	0.46**	0.59	0.00	0.16	0.25	0.48	2.35
size	19	9.50	1.18	7.31	9.13	9.57	10.38	11.24
ROA	19	0.04	0.24	-0.84	0.00	0.05	0.16	0.44
leverage	19	0.55	0.30	0.03	0.23	0.65	0.77	0.98
fsales	19	0.23	0.34	0.00	0.00	0.00	0.56	1.00

The table reports summary statistics partitioned by *IFRS*. *IFRS* is coded one if the company voluntarily adopted the International Financial Accounting Standards (IFRS) in the year of their admission to the exchange-regulated market and zero otherwise. *Placement* is coded one if the company offers stocks only to institutional investors prior to the listing. *Upgrade* is coded one if the company switched to a EU-regulated market at some point after the listing in the exchange-regulated market. *Big5* is a dummy variable coded one if the company is audited by one of the dominating auditors. *Words* is number of words of the annual financial statement deflated by total assets. *Ln_words* is the natural logarithm of the number of words of the annual financial statement. *Newstocks* is the ratio of newly issued stocks to existing stocks. *Size* is the natural logarithm of total assets (in thousand Euros). *ROA* is return on assets. *Leverage* is the ratio of non-equity to total assets. *Fsales* is the proportion of sales that is realized outside the country where the company is located. ***/**/* marks significance at the 1/5/10% level based on the two tailed t-test of the mean, the chi2 test of the mean of the dichotomous variables and the Wilcoxon rank test of the median.

The correlations of Table 12 show that the number of words is positively correlated with voluntary IFRS adoption, the proxy for diversified investors (*placement*) and the size of the company.

The multivariate results of Table 13 are generally consistent with the results of Table 9. The dependent variable in Model 1 is the number of words deflated by total assets and the dependent variable in Model 2 is the natural logarithm of the number of words. The coefficient of *IFRS* shows no significance in the first model and only a weak correlation (p-Value < 0.10) with the dependent variable in Model 2. It should be mentioned that the number of words is counted in the first IFRS annual statement. Hence, the results could be upwards biased due to first time adoption effects. Although IFRS requires additional disclosure

requirements compared to local GAAP, I cannot provide evidence that IFRS adoption is influencing the length of the annual financial statements.

These results should be interpreted with caution because of the endogenous choice of IFRS adoption. The results are only valid within the sample and, due to self selection, findings should not be generalized.

Furthermore, this analysis is based on the level of number of words and not on changes. Changes are difficult to obtain since annual statements prior to the admission to the exchange-regulated markets are often not available. To draw further conclusions about whether voluntary IFRS adopters do provide more transparency compared to local GAAP or not, further analyses with different proxies and different identification strategies are necessary.

One possible explanation for the findings could be that an increase in transparency is not the primary objective of firms to adopt IFRS. Rather they might adopt IFRS to use the same set of rules as firms of the EU-regulated markets; potentially increasing comparability with these firms.

Table 12. Pearson and Spearman Correlations – Entry Standard Sample

Variable	*IFRS*	*placement*	*upgrade*	*big5*	*words*	*ln_words*	*newstocks*	*size*	*ROA*	*leverage*	*fsales*
IFRS		0.26**	0.24**	-0.15	0.26**	0.32***	0.25**	0.06	0.03	-0.05	0.07
placement	0.26**		0.02	-0.04	0.07	0.21*	0.38***	0.10	-0.05	0.01	0.15
upgrade	0.24**	0.02		0.13	-0.01	-0.17	0.20*	-0.08	0.02	-0.02	0.01
big5	-0.15	-0.04	0.12		-0.11	0.03	0.03	0.12	-0.07	-0.09	-0.26**
words	0.10	0.04	0.09	-0.09		0.21*	0.22**	-0.59***	-0.33***	0.06	-0.05
ln_words	0.39***	0.29**	-0.17	0.00	0.15		-0.03	0.39***	0.08	0.22*	-0.04
newstocks	0.06	0.52***	0.01	-0.01	0.10	0.05		0.04	-0.34***	-0.09	-0.03
size	0.06	0.10	-0.08	0.12	-0.83***	0.33***	-0.02		0.21*	0.10	-0.15
ROA	0.05	-0.05	-0.06	-0.04	0.03	0.07	-0.10	0.02		-0.14	0.16
leverage	-0.02	0.00	-0.09	-0.12	-0.05	0.12	0.11	0.15	-0.15		-0.05
fsales	-0.01	0.12	0.01	-0.21*	0.11	-0.09	0.14	-0.14	0.17	-0.09	

The table provides Spearman correlations below the diagonal and Pearson correlations above the diagonal. *IFRS* is coded one if the company voluntarily adopted the International Financial Accounting Standards (IFRS) in the year of their admission to the exchange-regulated market and zero otherwise. *Upgrade* is coded one if the company switched to a EU-regulated market at some point after the listing in the exchange-regulated market. *Big5* is a dummy variable coded one if the company is audited by one of the dominating auditors. *Words* is number of words of the annual financial statement deflated by total assets. *Ln_words* is the natural logarithm of the number of words of the annual financial statement. *Institutional* is the natural logarithm of the value of stocks offered to institutional investors. *Retail* is the natural logarithm of the value of stocks offered to retail investors. *Instown* is the percentage of ownership from institutional investors. *Size* is the natural logarithm of total assets (in thousand Euros). *ROA* is return on assets. *Leverage* is the ratio of non-equity to total assets. *Fsales* is the proportion of sales that is realized outside the country where the company is located. ***/**/* marks significance at the 1/5/10% level

Table 13. Number of Words – Entry Standard Sample

	Model 1	Model 2
Dependent variable:	*words*	*ln_words*
placement	-0.254	0.183
	(0.435)	(0.184)
IFRS	1.038	0.681*
	(0.746)	(0.371)
*placement*IFRS*	-0.126	-0.208
	(0.976)	(0.382)
big5	0.348	0.241
	(0.456)	(0.181)
newstocks	0.707	-0.142
	(1.244)	(0.354)
size		0.161**
		(0.074)
ROA	-2.731	-0.081
	(1.735)	(0.415)
leverage	0.080	0.464*
	(0.683)	(0.249)
fsales	-0.474	0.026
	(0.725)	(0.261)
upgrade	-0.663	-0.371
	(0.777)	(0.250)
Listing FE	Yes	Yes
Industry FE	Yes	Yes
Time FE	Yes	Yes
Constant	Yes	Yes
R-squared	0.462	0.466
N	76	76

The table provides the results of the OLS regressions of the number of words in the first financial statements after the admission to the exchange-regulated markets. *Words* is number of words of the annual financial statement deflated by total assets. *Ln_words* is the natural logarithm of the number of words of the respective financial statements. *IFRS* is coded one if the company voluntarily adopted the International Financial Accounting Standards (IFRS) in the year of their admission to the exchange-regulated market and zero otherwise. *Placement* is coded one if the company offers stocks only to institutional investors prior to the listing. *Big5* is a dummy variable coded one if the company is audited by one of the dominating auditors. *Newstocks* is the ratio of newly issued stocks to existing stocks. *Size* is the natural logarithm of total assets (in thousand Euros). *ROA* is return on assets. *Leverage* is the ratio of non-equity to total assets. *Fsales* is the proportion of sales that is realized outside the country where the company is located. *Upgrade* is coded one if the company switched to a EU-regulated market at some point after the listing in the exchange-regulated market. Robust standard errors are provided within the brackets below the coefficients. ***/**/* marks significance at the 1/5/10% level.

6.3 Disclosure Compliance

Furthermore, I examine the disclosure compliance of voluntary IFRS adopters. If these firms seriously adopt IFRS, they should have high compliance. The compliance score is based on Cascino and Gassen (2014). I focus only on those parts of the financial statements where

the majority of firms have to make disclosures. In particular, I look at IAS 33 (Earnings per Share), IAS 38 (Intangible Assets) and IAS 39 (Financial Instruments).

I find that compliance is generally low and worse compared to the German mandatory IFRS adopters of Cascino and Gassen (2014). Especially disclosure of intangible assets (42.7%, Cascino and Gassen: 87.7%), and financial instruments (39.3%, Cascino and Gassen: 46.0%) are very low. This is surprising since voluntary adopters should have higher incentives to comply with the rules than mandatory adopters.

6.4 Exit Strategies

Another explanation for the finding that *placement* is positively related to *IFRS* but not to *quarter* could be different exit strategies of institutional investors compared to non-institutional investors. Non-institutional owners are often family owners which hold a significant amount of shares (Anderson et al., 2003). Family owners have a longer investment horizon and thus represent under-diversified block-holders that do not (or rarely) trade their shares.

Institutional investors have usually different exit strategies: They can sell their stock on the public market or the respective firm becomes an M&A target. In the latter case, it might be beneficial for the institutional investors to require firms to use IFRS because the consolidation with a potential buyer, which uses the same accounting system, could be relatively less costly. Thus, the adoption of IFRS might increase the likelihood of a future acquisition of the firm.

7. Robustness Tests - NYSE Alternext Sample

The analyses above separate the sample into firms that sell stocks prior to the listing to institutional investors and those that do not. This does not take into account that even within the IPO, stocks are sold to institutional investors and to retail investors.

The NYSE Alternext firms provide information about the number of shares that are offered directly to institutional investors within a "global placement" procedure and the number of shares offered to retail investors. Thus, firms from the NYSE Alternext markets (Amsterdam, Brussels, Lisbon, and Paris) provide a cleaner setting to investigate incentives stemming from diversified investors. The following analyses include the variables *institutional* and *retail*, the natural logarithms of the values of stocks offered to institutional investors and retail investors, respectively. Stock value is evaluated at the IPO price.

Furthermore, the Alternext subsample includes the second proxy for demand of institutional owners, the proportion of institutional ownership (*instowns*) prior to admission. This variable must not be confused with the share of block-holders. It rather captures the proportion of all institutional owners. If institutional owners are themselves owned by board members and/or their family members, the shares are assigned to private ownership. Furthermore, the models control for the value of shares offered by a capital increase (*capincrease*) and shares offered by existing shareholders (*disposal*). Unfortunately, this information is not given for all firms of the Entry Standard. Thus, detailed information on the ownership structure prior to admission and changes in the ownership structure are only available in the Alternext subsample. The following models are estimated only within the sample of firms listed in the exchange-regulated markets of Amsterdam, Brussels, Lisbon, and Paris (Alternext).

$$\begin{aligned}\text{prob}(IFRS) = \text{logit}(&\beta_0 + \beta_1 * institutional + \beta_2 * retail + \beta_3 * instown \\ &+ \beta_4 * foreign + \beta_5 * big5 + \beta_6 * size + \beta_7 * ROA \\ &+ \beta_8 * leverage + \beta_9 * fsales + \beta_{10} * fsales + \sum_{i=11}^{n} \beta_i * FE)\end{aligned} \tag{3}$$

$$\begin{aligned}\text{prob}(quarter) = \text{logit}(&\beta_0 + \beta_1 * institutional + \beta_2 * retail + \beta_3 * instown \\ &+ \beta_4 * foreign + \beta_5 * big5 + \beta_6 * size + \beta_7 * ROA \\ &+ \beta_8 * leverage + \beta_9 * fsales + \beta_{10} * fsales + \sum_{i=11}^{n} \beta_i * FE)\end{aligned} \tag{4}$$

Table 14 shows summary statistics for the reduced sample of these firms partitioned by IFRS. The value of stocks offered to institutional investors (*institutional*) is higher for IFRS adopters and the value of stocks offered to retail investors (*retail*) is less. Both differences are statistically significant. The proportion of institutional ownership prior to the listing is higher within the IFRS adoption sample.

Table 14. Summary Statistics – Alternext Sample

$IFRS_t = 0$	N	Mean	Sd	Min	P25	Median	P75	Max
quarter	113	0.11	0.31					
foreign	113	0.03	0.16					
upgrade	113	0.01	0.09					
big5	113	0.36	0.48					
institutional	113	14.82	3.59	0.00	15.02	15.50	16.11	17.12
retail	113	10.60	6.15	0.00	12.49	13.67	14.46	16.37
instown	113	0.38	0.34	0.00	0.03	0.33	0.62	1.00
size	113	9.09	1.13	6.24	8.35	8.99	9.64	14.43
ROA	113	-0.01	0.42	-2.47	0.01	0.04	0.14	1.02
leverage	113	0.62	0.28	0.00	0.46	0.62	0.80	1.87
fsales	113	0.25	0.33	0.00	0.00	0.03	0.49	1.00
$IFRS_t = 1$	N	Mean	Sd	Min	P25	Median	P75	Max
quarter	21	0.29**	0.46					
foreign	21	0.33***	0.48					
upgrade	21	0.10***	0.30					
big5	21	0.52	0.51					
institutional	21	16.13*	0.77	15.41	15.52	15.87***	16.52	18.20
retail	21	5.44***	7.13	0.00	0.00	0.00**	13.88	15.84
instown	21	0.56**	0.43	0.00	0.17	0.75*	0.98	1.00
size	21	9.69**	1.33	7.11	9.00	9.67**	10.49	12.41
ROA	21	-0.02	0.25	-0.62	0.00	0.03	0.16	0.27
leverage	21	0.58	0.23	0.06	0.39	0.65	0.77	0.95
fsales	21	0.28	0.32	0.00	0.00	0.20	0.50	0.90

The table reports the summary statistics of the Alternext sample partitioned by *IFRS*. *IFRS* is coded one if the company voluntarily adopted the International Financial Accounting Standards (IFRS) in the year of their admission to the exchange-regulated market and zero otherwise. *Quarter* is coded one if the company gives at least some information (e.g. sales and earnings) about quarterly financial data. *Foreign* is coded one if the company is located in a country outside its listed exchange-regulated market. *Upgrade* is coded one if the company switched to a EU-regulated market at some point after the listing in the exchange-regulated market. *Big5* is a dummy variable coded one if the company is audited by one of the dominating auditors. *Institutional* is the natural logarithm of the value of stocks offered to institutional investors. *Retail* is the natural logarithm of the value of stocks offered to retail investors. *Instown* is the percentage of ownership from institutional investors. *Size* is the natural logarithm of total assets (in thousand Euros). *ROA* is return on assets. *Leverage* is the ratio of non-equity to total assets. *Fsales* is the proportion of sales that is realized outside the country where the company is located. ***/**/* marks significance at the 1/5/10% level based on the two tailed t-test of the mean, the chi2 test of the mean of the dichotomous variables and the Wilcoxon rank test of the median.

The correlations of Table 15 show that *IFRS* is positively correlated with *quarter*, *foreign*, *upgrade*, *institutional*, *instown* and *size*. This provides univariate evidence that firms offering new shares to institutional investors and firms owned by institutional investors prior to the admission are more likely to voluntarily adopt IFRS. These firms' characteristics are not correlated with the issuance of quarterly financial information. Furthermore, firms that offer shares to non-institutional investors (*retail*) are less likely to voluntarily adopt IFRS.

The multivariate logistic regression in Table 16 supports the results of Table 7 and Table 9. The natural logarithm of the value of stocks offered to institutional investors (*institutional*) is positively significantly linked to the probability of voluntarily adopting IFRS. Furthermore, the percentage of institutional ownership prior to the admission (*instown*) is positively significant as well. Firms that are owned by institutional investors are more likely to voluntarily adopt IFRS. These firm characteristics do not have a significant influence on the issuance of quarterly reporting (Model 2). In addition, foreign listed firms are more likely to voluntarily adopt IFRS, but are not more likely to issue quarterly information (*quarter*). Overall, the results of the Alternext sample confirm prior results.

Table 15. Pearson and Spearman Correlations – Alternext Sample

Variable	*IFRS*	*quarter*	*foreign*	*upgrade*	*big5*	*institutional*	*retail*	*instown*	*size*	*ROA*	*leverage*	*fsales*
IFRS		0.19**	0.42***	0.21**	0.12	0.14*	-0.29***	0.18**	0.18**	-0.01	-0.05	0.04
quarter	0.19**		0.05	0.24***	0.05	0.01	-0.08	0.00	0.07	0.08	-0.17**	-0.03
foreign	0.42***	0.05		0.15*	-0.05	0.04	-0.37***	-0.03	0.00	0.04	0.13	0.10
upgrade	0.21**	0.24***	0.15*		-0.02	0.06	-0.12	0.10	-0.05	0.05	-0.05	-0.06
big5	0.12	0.05	-0.05	-0.02		0.12	-0.01	0.23***	-0.03	-0.15*	0.08	0.21**
institutional	0.24***	0.06	-0.05	0.08	0.14		-0.01	-0.03	-0.03	-0.12	0.01	-0.05
retail	-0.22**	-0.10	-0.31***	-0.14	-0.02	0.21**		-0.13	-0.04	-0.01	0.00	0.03
instown	0.15*	0.03	-0.04	0.08	0.25***	0.04	-0.05		-0.02	-0.20**	-0.08	0.07
size	0.19**	0.12	0.01	-0.04	-0.03	0.27***	0.02	-0.02		0.22**	0.10	0.16*
ROA	-0.07	0.06	0.11	0.03	-0.14	-0.10	-0.03	-0.30***	-0.21**		-0.17*	0.03
leverage	-0.03	-0.15*	0.06	0.00	0.01	-0.08	0.02	-0.09	0.21**	-0.10		-0.08
fsales	0.04	0.03	0.09	-0.04	0.18**	0.07	0.09	0.08	0.15*	0.02	-0.10	

The table provides Spearman correlations below the diagonal and Pearson correlations above the diagonal. *IFRS* is coded one if the company voluntarily adopted the International Financial Accounting Standards (IFRS) in the year of their admission to the exchange-regulated market and zero otherwise. *Quarter* is coded one if the company gives at least some information (e.g. sales and earnings) about quarterly financial data. *Foreign* is coded one if the company is located in a country outside its listed exchange-regulated market. *Upgrade* is coded one if the company switched to a EU-regulated market at some point after the listing in the exchange-regulated market. *Big5* is a dummy variable coded one if the company is audited by one of the dominating auditors. *Institutional* is the natural logarithm of the value of stocks offered to institutional investors. *Retail* is the natural logarithm of the value of stocks offered to retail investors. *Instown* is the percentage of ownership from institutional investors. *Size* is the natural logarithm of total assets (in thousand Euros). *ROA* is return on assets. *Leverage* is the ratio of non-equity to total assets. *Fsales* is the proportion of sales that is realized outside the country where the company is located. ***/**/* marks significance at the 1/5/10% level.

Table 16. Reporting Choices – Alternext Sample

	Model 1	Model 2
Dependent variable:	*IFRS*	*quarter*
institutional	1.651*	0.034
	(0.988)	(0.086)
retail	-0.088	-0.026
	(0.071)	(0.042)
instown	3.835**	-0.492
	(1.555)	(0.709)
foreign	5.436***	0.359
	(1.831)	(0.785)
big5	1.798	1.084*
	(1.243)	(0.603)
size	1.542**	0.468*
	(0.695)	(0.224)
ROA	1.266	0.348
	(1.665)	(0.996)
leverage	-2.549**	-3.561**
	(1.027)	(1.495)
fsales	-1.088	-0.498
	(1.151)	(0.953)
upgrade	6.166**	4.368**
	(1.816)	(1.933)
Listing FE	Yes	Yes
Industry FE	Yes	Yes
Time FE	Yes	Yes
Constant	Yes	Yes
LR	0.001	0.151
R-squared	0.555	0.219
N	134	134

The table provides the results of the logistic regressions of the voluntary adoption of IFRS and voluntary issuance of quarterly information at the admission the exchange-regulated market. *IFRS* is coded one if the company voluntarily adopted the International Financial Accounting Standards (IFRS) in the year of their admission to the exchange-regulated market and zero otherwise. *Institutional* is the natural logarithm of the value of stocks offered to institutional investors. *Retail* is the natural logarithm of the value of stocks offered to retail investors. *Instown* is the percentage of ownership from institutional investors. *Foreign* is coded one if the company is located in a country outside its listed exchange-regulated market. *Big5* is a dummy variable coded one if the company is audited by one of the dominating auditors. *Size* is the natural logarithm of total assets (in thousand Euros). *ROA* is return on assets. *Leverage* is the ratio of non-equity to total assets. *Fsales* is the proportion of sales that is realized outside the country where the company is located. *Upgrade* is coded one if the company switched to a EU-regulated market at some point after the listing in the exchange-regulated market. Robust standard errors are provided within the brackets below the coefficients. ***/**/* marks significance at the 1/5/10% level.

8. Conclusion

This paper investigates reporting choices of firms listed in European exchange-regulated markets. In particular, it sheds light on the decisions to voluntarily adopt IFRS and to voluntarily increase quarterly reporting in the European exchange-regulated markets of Amsterdam, Brussels, Frankfurt, Lisbon, and Paris.

I find that firms rarely use IFRS and rarely provide quarterly information. Furthermore, even IFRS adopters mostly do not provide quarterly financial information. Determinants models show that the proxies for diversified investors are positively related to voluntary IFRS adoption but not to voluntary quarterly information disclosure or the length of the annual statements. One possible explanation might be that firms primarily adopt IFRS in exchange-regulated markets to use the same set of rules as firms listed in EU-regulated markets. IFRS adoption could be driven by diversified investors who benefit more from the same set of rules compared to non-diversified investors.

Until today, there is still no clear understanding why firms adopt IFRS and what the economic consequences are. In this study, I could not find evidence that voluntary IFRS adopters provide more information compared to local GAAP firms: They rarely provide quarterly information, their compliance is surprisingly low and the length of the financial statements is, when controlled for size effects, not significantly more. Taken together this could indicate that some firms just adopt the label IFRS, but do not really change their reporting behavior.

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